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BRIEFLY TOLD.

THE SITUATION IN NEW YORK CITY.—To-day (Thursday, August 24) the proprietors of the Consolidated Gas Company announced that their rate of dividend for the past quarter would be 1 per cent. The announcement of the cut, which amounts to the matter of putting the Company on a 4 per cent. basis instead of a 6 per cent. basis, as per its last shrinkage from an 8 per cent. footing to a 6 per cent. one, was well received by the market, in that the announcement did not break the quotations for the stock over a point. The declaration of the dividend rate was disappointing to those who hoped that no dividend would be declared, for many thought that the dividend would be passed. The managers of the Consolidated Company, however, are to be congratulated on the conservative stand that they have assumed in this instance, since their action shows that, with a selling rate of 65 cents per 1,000 cubic feet, and without any tunnel under the East river, they are quite able to pay to their *shareholders* a good return on the money invested. In the meantime, which time may be long or short, the proprietors of the New Amsterdam Company should carefully see to it that the funds for their next interest payment are at their command. The long and short of this gas war in New York city is too ridiculous, for there can be only one termination to it. If outsiders want the Consolidated they will have to pay the price for it, and those who will name the price are those who own and control the Consolidated Gas Company.

A WORD FROM DULUTH, MINN.—We would advise every gas man in line of our printing to obtain a copy of the "First Annual Report of the Board of Water and Light Commissioners, of the City of Duluth, Minn., for the Year Ended June 30, 1899." The document also embraces the report of the Manager, Mr. L. N. Case. Of course, Mr. Case's report is not to be taken as fairly representing that which may be done at Duluth in respect of gas or water supply, since these properties have only been taken up on city account for something not much over a year; but there is one thing in his statement to which we give our unqualified support, and that is as to the utter worthlessness of kalamein pipe for either gas or water transmission. Very much preferable, for gas sending on at least, would be the vitrified clay pipe proposed at the last meeting of the Western Gas Association. It is needless to say that we are not interested either in iron pipe foundries or in clay pipe productions; but to us it looks that the latter is about to have its day for substitution over the former in the instance of conveying gas in great quantities through fairly stable situations.

NOTES.—The New England Gas and Coke Company claims that its sale of coke is so large that it will have to enlarge its oven capacity. Perhaps. Meanwhile, it looks to us that, as a dividend payer, it will about equal the capacity of the Bay State Gas Company, of Delaware. ——The Cincinnati Gas Light and Coke Company has accepted, without quibble, the ordinance that obliges it to sell illuminating gas at 75 cents per 1,000 cubic feet, and fuel gas at 50 cents per 1,000. No separate services on fuel account will be exacted.

Edward Orton.

[By MARCUS BENJAMIN, Ph. D., in *Sci. Am.*]

When the council of the American Association for the Advancement of Science, met in Boston last summer to decide upon a place in which to hold the meeting this year, invitations were presented from several cities, but the cordial and earnest words of the representatives of Col-

umbus, O., proved irresistible, and it was decided to accept the invitation from that place. So strong a plea was presented by them that when the choice of a President came to be considered a few moments later, the unwritten but time-honored rule that a representative of the physical sciences be chosen to succeed a representative of the natural sciences was passed over in the desire to do honor to the distinguished State Geologist of Ohio.

Edward Orton, who was born in Deposit, N.Y., on March 9, 1829, is the son of the Rev. Samuel G. Orton, a Presbyterian clergyman of well-known standing in New York State. The boy spent his early life in Ripley, Chautauqua county, and there obtained a common school education. He was ambitious, and desiring greater knowledge, opportunities were afforded him to procure a college course, and he entered Hamilton, where he was graduated in 1848. The home influence is clearly indicated by his desire to follow in the footsteps of his father, and he began his theological studies in the Lane Seminary, where Dr. Lyman Beecher was then dominant, and later he studied at the Andover Theological Seminary.

No student of the history of science in this country can ignore the wonderful advancement of science that followed the coming of Louis Agassiz to America; and beyond doubt it was his influence, direct or indirect, that led the young student of theology to turn his steps toward Harvard and enter the Lawrence Scientific School, where he came in personal contact with that great master.

The wise words of the poet, "Knowledge comes, but wisdom lingers," were fully appreciated at the Lawrence School in those days, for the students were taught to think. Thinking students make good teachers, and good teachers are successful men. In President Orton's career this fact is clearly demonstrated.

Soon after completing his studies, he accepted a call to the chair of natural sciences in the State Normal School in Albany, N. Y., and there began a successful career of teaching, which he has never abandoned.

In 1865 he was invited to the professorship of natural sciences in Antioch College, Yellow Springs, O., and of this institution he was made President a few years later.

Success was the result of his ability to teach, and his reputation extended beyond the limits of his own college, for he was called, in 1872, to the Presidency of the Ohio State Agricultural and Mechanical College in Columbus, O., with charge of the Department of Geology. Later, that college became the Ohio State University, and the duties of its President became more onerous, and in 1881 he resigned from the higher office, but retained his Professorship of Geology.

As a geologist President Orton has gained for himself also a high place among his contemporaries. During the years 1869 to 1875 he was Assistant State Geologist under the able and gifted Newberry, and then after a brief interval returned to the survey in 1881 as State Geologist with full charge of its work.

His special investigations have shown a leaning toward the development of the economic wealth of Ohio, and his published writings include the two volumes on the "Economic Geology of Ohio," issued in 1883 and 1888, and his valuable report on "Petroleum and Inflammable Gas," issued in 1887.

One of the finest of the University buildings was named Orton Hall in appreciation of his services both to the State and the University. The building, which cost more than $100,000, is of decided architectural beauty and contains a series of geological specimens collected from every part of the State. It is regarded "as a monument to the worth and work of Doctor Orton." Other honors have come to him. The degree of Ph.D. was conferred upon him by his alma mater in 1876, and on his retirement from the Presidency of the Ohio State University in 1881 that institution gave him the degree of LL.D. Scientific societies have recognized his worth, and he was President of the State Sanitary Association of Ohio in 1884–85, and later of the Geological Society of America.

He joined the American Association at its Troy meeting in 1870, and five years later was advanced to the grade of fellow. In 1885 he presided over the section on Geology and Geography at Ann Arbor, but "a fitting crown to his long and useful life was placed on his brow last summer when the American Association for the Advancement of Science made him its President."

It has recently been well said of him, "As a scientist of rare attainments, and as a man of rare personal charm, Dr. Orton has always retained the admiration and the affection of the University, the community and the State." We hail him as a worthy successor of Agassiz and Newberry in the Presidential chair of the American Association.

[Prepared for the JOURNAL.]

Gas Pipe Engineering.

By MECHANICAL ENGINEER.

Bearings for Gas Pipes.—Bearings for gas pipes may be divided into several classes, and these classes again subdivided, the cylindrical forms of bearings being the most extensively employed in gas piping systems, which include many of the patterns of brackets, jacks and other supports. The flat or parallel surface bearings are suitable for special service, and are found in use in a number of modern styles of gas pipe installations. The roller, pivot and other descriptions of bearings of this class are not employed, except in special cases where the conditions require something different from the ordinary cylindrical bearing. The recent laws and regulations which have been adopted in many States for governing the methods of installing gas pipe systems have tended to develop some new descriptions of supporting bearings, some of which will be found described in the accompanying illustrations. There were times when gas pipes could be run along the top of wood ceilings, with only a wood supporting block or similar fire inviting device. The fire insurance inspectors are too wary to permit this mode of installation now, even if the rules of most of the States were not formed to restrict dangerous connections with the structural parts of a building. It means a penalty in some places for a gas pipe fitter to lay gas pipes on wood blocks along a wood ceiling, partition or dividing wall of any sort; yet it is frequently done, and sometimes with disastrous results. In instances where the pipe passes upon or parallel with the woodwork, as in Fig. 1, iron jacks should be employed, as at *A A* and *B B*, for supporting the pipe and holding it away from the wood. The jacks are simple, cast iron stands, shaped with flat face through which the hole for the pipe is bored and the base of which is even with the shoulder for attaching to the wood, by means of screws, as with the jack *A A*, or the base is square or at an angle with the shoulder, like the jacks *B B*. In Fig. 2 is shown another form of the jack, the bearing of which is provided with lips at the sides through which are passed the adjusting bolts *C C*. These bolts are threaded into the lips and the bearing can, therefore, be adjusted at required distances from the woodwork of the building. This style is known as the adjustable type, as it can be set as desired.

Rigid Forms of Bearings.—In Fig. 3 is shown a rigid style of gas pipe bearing, which is calculated to adjust to a beam, woodwork or masonry of any kind rigidly. There is no chance to move the pipe further in or out with this kind of bearing, yet it is preferred by many fitters for work in which the adjustment can be made permanently at the beginning. If the conditions are such that the pipe needs readjusting at times, the movable bearing is of course preferred.

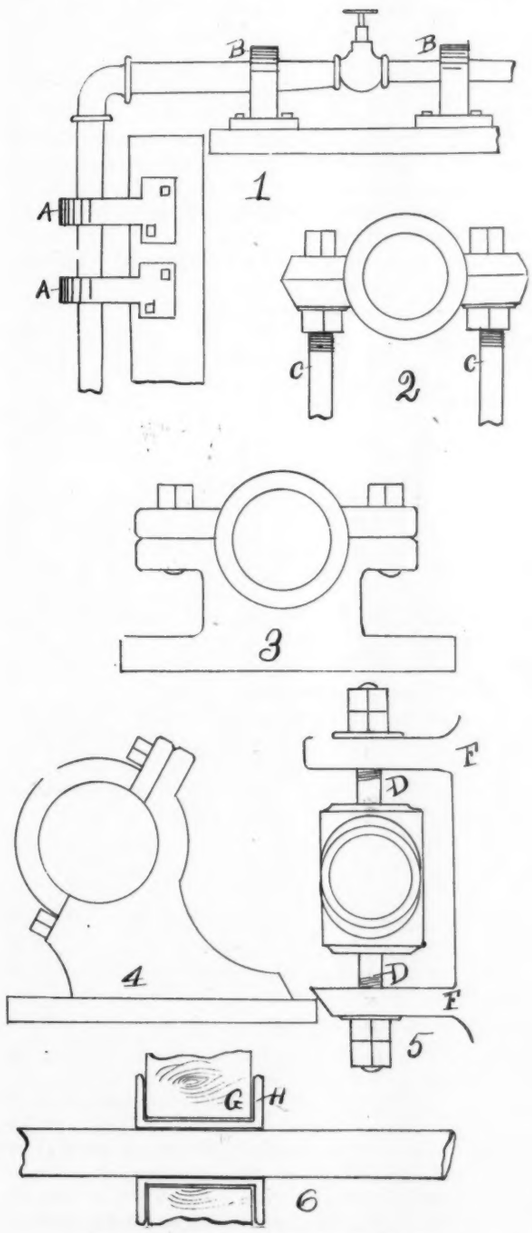
Pedestal Bearing.—Pedestal bearings for gas pipes are chiefly for heavy work. One of these bearings, shown in Fig. 4, is of the diagonal pedestal type, as that is the form ordinarily used. They are made in all sorts of forms, and the general contour and curves are seldom alike in any two sets of these bearings. In setting up work with this bearing, as well as with the two former in which caps and cap screws are used, precautions should be taken to see that the caps are well fitted. If a bearing is used in which the cap is too small, the pipe is liable to be buckled by the compression of the cap when tightened down with the screws. If the cap is too large the pipe will be wabbly. Most of the bearings are received by the gas pipe fitters and engineers all ready for use, but in some cases the bearings are bought direct from the foundry, and must be bored, tapped, provided with screws and finished. In this case see that the caps and screws harmonize perfectly when the cap is secured in its place, otherwise the edges of the cap may chafe into the metal of the gas pipe and produce a leak.

Adjustable Hanger Bearings.—The form of adjustable hanger bearing, shown in Fig. 5, is for piping systems from post to post in buildings. The plan is used mainly in manufacturing establishments where there are no spaces between walls or ceilings and where the surroundings are such that it is wisdom to have the gas pipe line in plain view. The hanger is of cast iron, brass or other metal, and is provided with means for attaching to posts by lag screws or bolts. The arms *F F* project straight out and are bored for the adjusting screws *D D*. The bearing for the pipe fits between these screws as shown, and can be adjusted as required.

Metal Lined Wood Bearings.—In Fig. 6 is a sectional drawing of the so called metal lined wood bearing for gas pipes. A common piece of 2-inch board is bored out the diameter of the metal bushing *H*, and the piece is then split through the center so as to permit the bushing to be put in. The wood part is marked *H*. After the bushing is adjusted

the pieces are joined and cleated, thus making a cheap and substantial bearing.

Fastening Keys for Gas Pipe Bearings, Collars, etc.—Fastening keys, for securing flanges, collars and similar work to gas pipes for special purposes, are of several kinds, but may be classed as flat keys, square keys, half-round keys, round keys and keys of special design.



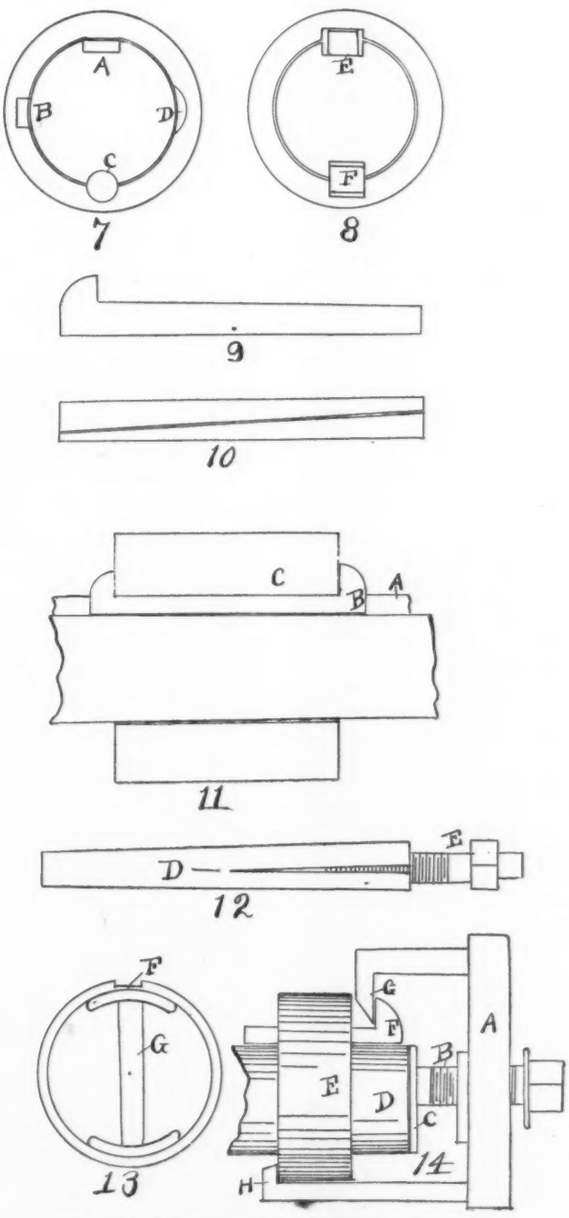
Figs. 1 to 6.—Supporting Bearings for Gas Pipes.

The ordinary flat key, acting as a diagonal strut, is shown in Fig. 7 at A, inserted in such way that it is not always secure. In this case the key is sunk into a key seat cut into the work, and depends altogether upon frictional means for sustaining the collar or flange to the work. The key must bind tightly top and bottom or it will slip. The other extreme is shown in the same cut at *B*, in which the key is sunk into the collar and depends upon binding to the work for its security. Often such keys are driven in hard enough to split the collar and yet not hold. Looking next at the oval or partly round key *D*, we find that this key will not tend to split the collar, and it also offers large contacting surface with the work, yet it is not so serviceable a key as the kind which is sunken into both the collar and the work, as in the case of the round key, at *C*. To insert this key requires merely a boring of the collar and work at same time. These round pins are often threaded with good results, thus permitting their removal readily.

Feather Keys.—The most useful and practical keys used are, of course, the plain square keys, which are feathered into place and, if properly done, are effective for a long time. In Figure 8, at *E*, one of these keys is shown improperly placed. The key binds at the top and bottom and a space is left at each side. Such a method of key connection will not hold. The key may bind at the sides and there may be spaces at top and bottom as at *F*, and the key will keep its hold indefinitely. The key, therefore, should be made accordingly. Fig. 9 is a good form for a key of this class, although the double key, Fig. 10, is used with some success.

Sliding Feathers.—Sliding feathers are sometimes requisite in connection with the installation of gas pipe systems, one of which is shown in Fig. 2. The key seat is cut into the work as at *A*, and should be of liberal proportions so as to permit the key, *B*, to slide back and forth easily and without friction on the sides. The key binds to the collar or flange, *C*, and of course moves with it.

Split Key.—The pattern of split key in Fig. 12 is serviceable on some occasions, and is made by splitting the key about half way down with a hack saw, after having first bored out and tapped the key with a thread for the expanding screw, *E*. When this screw is not in place the key



Figs. 7 to 14.—Types of Fastening Keys for Gas Pipe Works.

remains at its normal shape. When the screw is turned into the key the latter expands accordingly and tightens up on the work.

To Prevent Collapsing of the Pipe Wall.—In the event of cutting a key seat in the wall of a pipe, as at *F*, Fig. 13, the pipe may be weakened at that point, unless means are taken to brace from the in-

side. Some fitters find a remedy by using braces like *G*. These can be made by soldering pieces of tube the right curve to a center piece, and the whole is then soldered inside the pipe where it will support the pipe wall where weakened by the key seat.

For Drawing Keyed Flanges.—Keyed flanges should be drawn from the pipe by means of a device made for the purpose. In Fig. 14 is one made by the writer. The main bar, *A*, is brass, and is fitted with the hooks, *G* and *H*, which hooks fit over the key in the collar and the collar itself as shown. A pressure pin, *B*, is provided and is threaded into the bar and arranged with a head piece, *C*, to force the pipe, *D*, out through the flange, *E*, while the upper hook draws the key *F*. This affair can easily be constructed by any gas pipe fitter from odds and ends about the shop.

[Official Report—Revised by the Secretary—Continued from Page 290.]

SEVENTH ANNUAL MEETING, PACIFIC COAST GAS ASSOCIATION.

Held in San Francisco, Cal., July 18 and 19, 1899.

Second Day, Morning Session.

The Secretary read the following

Report of Committee on Nomination of Directors.

To the Officers and Members of the Pacific Coast Gas Association: Your Committee appointed to select a Board of Directors for the ensuing year recommend the following: Mr. L. P. St. Clair, of Bakersfield, Cal.; Mr. W. A. Aldrich, of Spokane, Wash.; Mr. C. M. Converse, of San Francisco; and Mr. R. M. Powers, of San Diego, Cal.

Respectfully, G. H. Taylor, A. Gutsch, } Committee.

On motion of the Secretary the recommendations were adopted.

Routine Business.

The resignations of Mr. B. U. Steinmann and Mr. G. W. Jackson from membership were accepted. The President announced that Mr. Geo. H. Hollidge had been reappointed

Editor of the Wrinkle Department,

and that Mr. O. M. Gregory would take charge of the

Experience Department.

Mr. Hollidge, in accepting the reappointment, said: I do not mind taking charge of the Wrinkle Department again, but I feel that I must say the members were slow in sending anything in this year. I find when I go to various works that many Wrinkles are there to be seen, and I have taken account of many of these. The main fault with our people is that when they have a nice little Wrinkle at their works they seem to think that everybody else is familiar with it, while, as a matter of fact, probably not more than two or three of us knew anything about it at all. I have had to send all the way to London for some of these Wrinkles, as I did not seem to be able to get them out of members of the Association. I have had 12 months to drum them up, however, and as a result have a larger Wrinkle collection than last year. Quite a number of them, however, came from outside the Association I hope next year you will contribute more liberally. Look around and see if you have not a Wrinkle that has not come out before; if you have, send it along.

Editor Hollidge then read the following collection of

WRINKLES,

introducing them as follows:

This Wrinkle Department, which I herewith submit to you for your consideration and approval, will be seen to contain devices from afar as well as from the members of this Association.

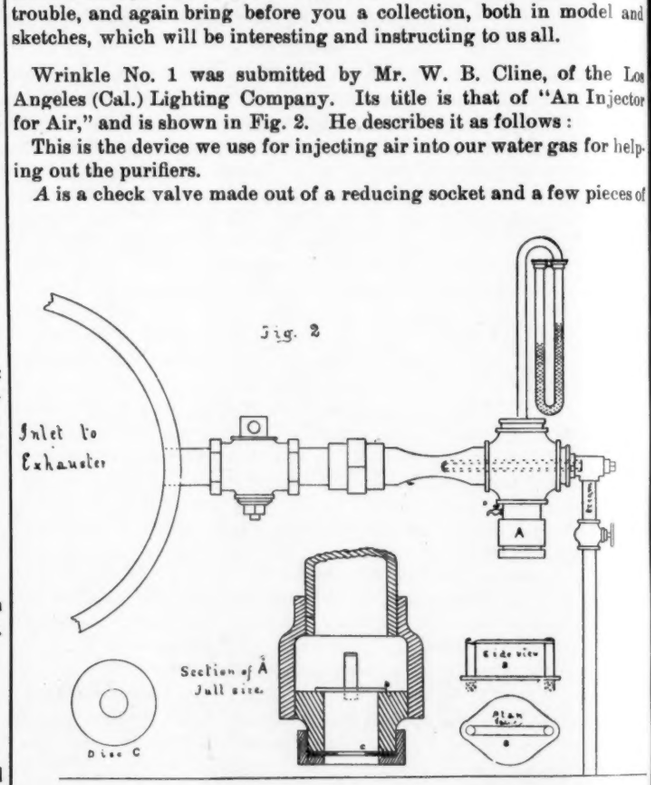
At our last annual meeting you unanimously elected me to again represent this special department, and while I thank you for the honor conferred upon me, I assure you I have left no stone unturned to bring before you the many that you see both in model and in drawing. And while some of the wrinkles are not entirely new to many of us, yet there are many with us at this meeting who have not had the opportunity of seeing many of this collection. And for that reason I left no wrinkle out that would in any way be of interest to us, as what may appear uninteresting to me is very valuable to others, and vice versa. During my visits to different gas works represented by our members, I always made a practice of watching for devices for this department, and should I see any improvements which I considered would be of benefit to us, I have lost no time in bringing them before you, for I realize, however well informed we may be, yet our school of learning is always open, and any articles or devices seemingly unnoticed by us in many instances are sometimes powerful factors in economy and labor and expense, and so are of material benefit to us and the consumer.

I must not forget, however, at this special time to thank the members of the Association who so willingly contributed toward this collection, and while many of these wrinkles, however small, represent much correspondence, yet nevertheless we feel well paid for our trouble, and again bring before you a collection, both in model and sketches, which will be interesting and instructing to us all.

Wrinkle No. 1 was submitted by Mr. W. B. Cline, of the Los Angeles (Cal.) Lighting Company. Its title is that of "An Injector for Air," and is shown in Fig. 2. He describes it as follows:

This is the device we use for injecting air into our water gas for helping out the purifiers.

A is a check valve made out of a reducing socket and a few pieces of



Wrinkle No. 1.

old globe valves made over. It has an aluminum valve *B* (for lightness), to keep the gas from backing out. *C* is a disc with an opening that will pass a known quantity at the different pressures. If we want 200 feet per hour we regulate the injector to give 1 inch vacuum, etc.

Wrinkle No. 2 was also submitted by Mr. Cline. It illustrates a "Registering Pressure Gauge" (Fig. 1), which is in full operation at his works and is giving every satisfaction. The following detail affords the needed explanations. We use this gauge on our generator blast-pipe. It serves as a check on the number and regularity of the runs made during the 24 hours. The pressure acts on the water in cylinder *A*, forcing it down and into cylinder *B*, raising float *D*, with pencil attached, marking card on *C*. The cylinder *C* is revolved by a clock work once in 24 hours. The counterweight *E* takes up all lost motion of the coupling between *C* and the clock considerably. The object of the 2-water cylinder arrangement is that we can use a sheet ¼ the size, as you will see by the sample, and of course the cylinder *C* will be shortened and lightened likewise. This gauge is home-made, neat and strong, and cost something less than $20.

Wrinkle No. 3 is a "Rack for Holding 24 Lamps to Prevent Breaking." This wrinkle was adopted and put into practice in order to prevent breaking of glass, for one thing, and to carry more on the wagon, for another.

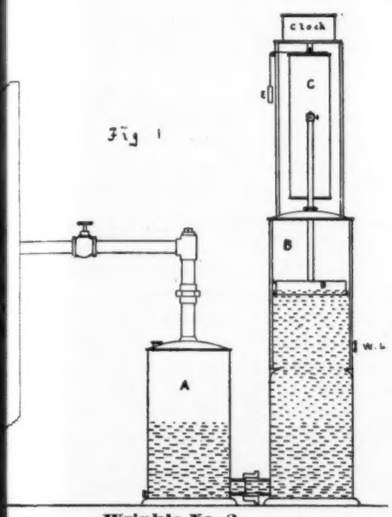
It can easily be made for use and can always be put in some place till required again. It is one of the most handy things around a gas works when the time arrives to change or paint lamps.

Fig. 1 shows the rack in operation ready for business; Fig. 2 shows how it can be made.

There was no discussion on Wrinkles 1, 2 and 3. Editor Hollidge here said: I see I have two Wrinkles numbered 3. We will call this one 3a, and I have no illustration of it. However, as it is a particularly

meritorious one, I will attempt to describe it. It is a hydraulic jack, made in London, England. I think the common method of forcing pipes apart on this Coast is exceedingly crude, sometimes going as far as to disconnect the mains at both ends and making fires in the joints, which, in my estimation, is one of the most dangerous things that could be done to a cast iron pipe. Another method of disconnecting large mains is to gouge around close up to the joints and then burst them off with a pipe wedge, thereby losing 6 or 7 inches at each joint. This English jack was described in a scientific paper, and I wrote to the manufacturers (Messrs. Biggs & Wall), telling them I thought we could make use of it. With it the pipe can be actually pushed out, lead and all. I think our English cousins are behind us as a rule, but this time they are ahead of us in this special department at any rate. It is a patented article.

Mr. Aldrich—It seems to me this jack is one of the most important articles that has been brought out for some time.



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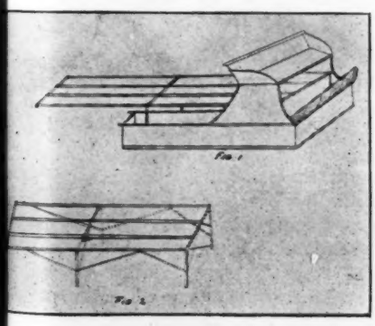

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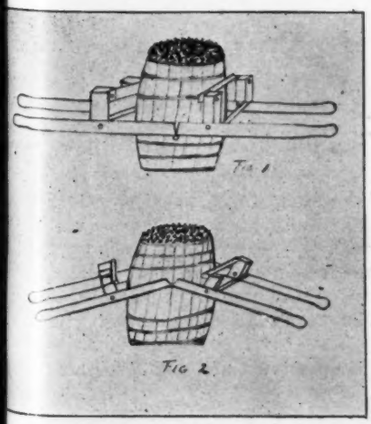

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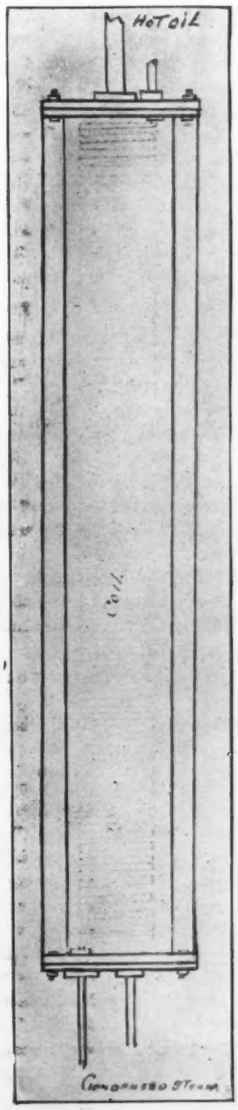


Wrinkle No. 4.

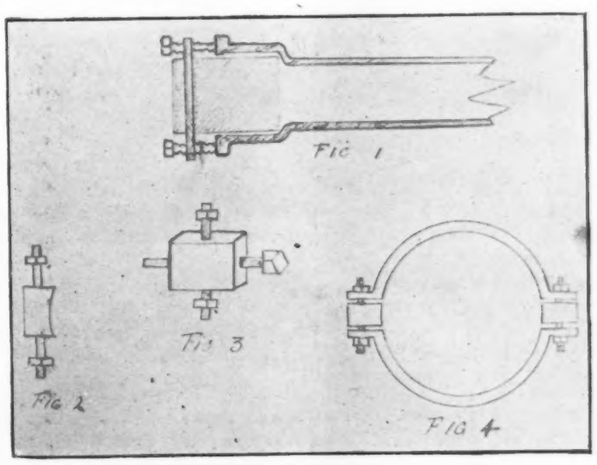
Mr. Hollidge—The jack is made by Messrs. Biggs & Wall, No. 13 Finsbury Pavement, London, England. Its cost I do not know.

Mr. Aldrich—The time is coming, I think, when we shall be more familiar with Kalamein pipe. The more experience I have with it the more I like it. I consider it is better than cast iron pipe and will last much longer. The only trouble is when you want to disconnect any you have to break the hub, whereas with this jack it could be easily forced apart.

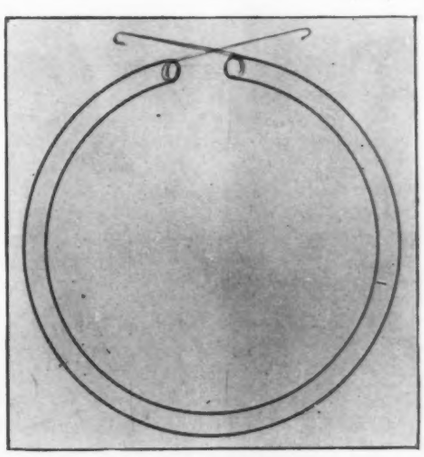
Wrinkle No. 4, submitted by Mr. A. L. Rice, of Riverside, Cal., describes a "Cheap Oil Heater for Water Gas Works."

Take a section of flange pipe wide and long enough to hold maximum amount of oil, make a close spiral ¼ or ½-inch steam coil length of heater. Put a blind flange on each end with oil outlet tapped into bottom, bring the outlet in the top with long threads, then bolt the heads tightly with thin lead or copper gaskets. Lock the steam and oil connections with lock nuts and copper gaskets. There being no circulation, the oil gradually heats as it rises by drawing off at the top.

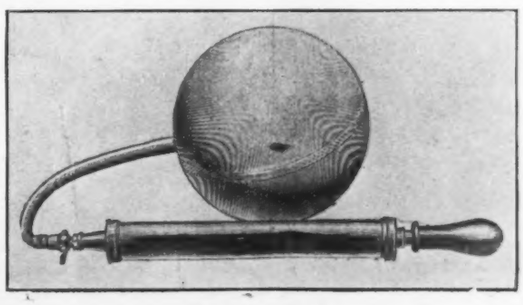
No cold oil comes in contact with the upper end of the steam coil to



Wrinkle No. 6.



Wrinkle No. 7.



Wrinkle No. 8.

cause condensation, thus giving the oil at the outlet nearly the same temperature of the steam and rapidly vaporizes Coalinga crude oils or Los Angeles distillates. The cut (Fig. 4) shows the apparatus plainly.

Wrinkle No. 5 describes "A Small Machine to Manipulate a Barrel to Prevent Breaking," etc.

This wrinkle was adopted, as usually known to gas men, by force of circumstances. Seeing so many barrels so roughly handled and broken, which barrels by the-way are so handy around a gas works, brought forth this idea for a barrel preservative. It is easily handled into a wagon or cart, prevents dropping coke all over the place, is neat, handy and lasting. Fig. 1 shows the wrinkle holding the barrel; Fig. 2 shows how easy it is slipped over a barrel and manipulated.

Wrinkle No. 6 is "A Jack Device for Forcing our Plugs from Mains and also Forcing Joints."

This little device can be made at home. Fig. 1 explains the mode of procedure; Figs. 2, 3 and 4 will show how it is made. It will be found exceedingly handy, dispensing with a fire or a cracked socket or bell, by constant hammering to loosen up the plug.

Wrinkle No. 7, which is contributed by Mr. A. L. Rice, of Riverside, Cal., shows "A Gasket for Running Lead for Street Main Work."

This wrinkle, as shown in the illustration, was brought forward by necessity being the mother of invention. Simply obtain a piece of rubber hose, run a piece of stout copper wire through as shown, run it through your hand full of wet clay before putting into place. The result will be that a good, clean joint is run. It is needless to say that a clay gate should be made for the introduction of lead.

Mr. Hollidge—No. 7 is another thing that Mr. Rice thought so simple as not to be worth while giving to us. I really think the simpler a thing is the better.

Mr. Rice—It is not necessary to have any particular kind of mud to rub over your joints to prevent any possible leaks. Just take it and rub it around you pipe, taking particular care to rub it around the bottom. For a 4-inch pipe I would use ½ inch hose.

Wrinkle No. 8 shows a "Gas Bag Pump." This wrinkle is furnished for the purpose of blowing up gas bags in mains. During repair simply leave it connected and blow up the bag when necessity requires. It was brought forward to dispense with blowing up the bag with the mouth, so often resulting in men being partially asphyxiated.

Mr. Hollidge—A man will sometimes get asphyxiated when working on mains, but by simply placing this little pump on all possibility of accident is prevented. It may be left connected and is always there.

Mr. Clements—You might send it to the Board of Health of San Francisco.

Mr. Gregory—We formerly had stronger bags and could have put them on a pump. These bags are quite thin, and if a man were given a pump he would break the bag every time. Bags cost money, and I think a man might break his lungs in preference to the bag.

Mr. Hollidge—I would say that bags are almost antiquated. I have another wrinkle here that will do up the bags in two rounds. To-day we do not use any more bags in our large works; but I thought that as I had it I might just as well exhibit it.

Wrinkle No. 9, submitted by Mr. Nicholson, 14 Northgate, Halifax, England, shows a "Hydraulic Jack Apparatus for Disconnecting Cast Iron Mains, or any Ordinary Work about the Yard."

With this apparatus the joints of any size can be drawn with perfect ease, entirely dispensing with cutting and wasting mains, and of building fires under the joints; saving time materially, without fear of broken pipes, the latter when drawn being as sound as when new, and ready for relaying without any trimming of broken ends. It can be used for other work where force is necessary for lifting of any kind or nature.

Figure 1 shows the jack in action; Fig. 2 shows the jack; Fig. 3 shows belts for any size of mains to be disconnected.

Wrinkle No. 10 describes "A Gasket for the Purpose of Running Joints on Cast Iron Pipe."

These gaskets can be cut and made any size from square rubber, and have the iron work forged in the neighboring blacksmith's shop. They are easily made and will last a long time with care. The illustration is an ample description.

Wrinkle No. 11 is by Messrs. Biggs & Wall, London, England. It shows a "Rapid Manual Charging Machine." This machine was designed for the purpose of increasing the production of gas and giving greater ease in drawing and reducing the hard labor in connection with charging retorts.

To operate the machine, fill the scoop with coal, slip the carrier over the scoop, apply the power by pulling the wire rope, as shown (Fig. 1), making the drum revolve. The wire rope feeds itself on to it; when the scoop is opposite the mouthpiece, the scoop driver drives the machine and the impetus gained in the short travel of the machine carries the scoop to the full length of the retort; overturn it and draw for refilling. This whole operation takes less than half a minute.

For ordinary shovel and scoop charging skill is requisite, but this machine does its own work; simply turn over the scoop or fill it. This method increases the production of gas, as each charge is evenly distributed throughout the retort, the lids are more quickly sealed, the scattering of coal is decreased, and hence there is an increase of gas. The arduous labor of the stoker is reduced to a minimum.

Fig. 1 represents scoop in action ready for sending home the scoop when on a line with the mouthpiece; Fig. 2 shows side elevation; Fig. 3 shows side elevation; Fig. 4 shows top.

Mr. Collins—Will one scoop carry a complete charge?

Mr. Hollidge—It could be made to. This machine I understand was gotten up for a 3-man works, where the excessive amount of charging and drawing has been very hard on one or two men. By this method two men could do the work with greater ease than three men could without it, and more gas could be gotten out of each charge than could be if a shovel were used. It distributes the charge evenly, and where coal is evenly laid in a retort you can obtain more gas from it.

Wrinkle No. 12, by Mr. O. M. Gregory of San Jose, Cal., is thus described by him.

This wrinkle was put into practice to obviate the necessity of making large connections. In changing our purifier, when making coal gas and turning the gas into the working holder, the candle power would always diminish, no matter what precaution was taken. To change this state of affairs we made a 3 inch connection (as shown in cut) to the relief holder, from the 8-inch main leading into the working holder. We then closed valve *B* on the 8-inch main, opened valve *C* on the 3 inch main, when about to change a purifier. After changing the gas found its way into the relief holder without back pressure. Then as our working holder would need replenishing, we would pump the gas into it from the relief holder. By this method we lost no candle power; and, finding the 3-inch connection large enough to carry all the gas, it saved in the cost of making large connections and maintaining our candle power.

Wrinkle No. 13, which is also communicated by Messrs. Biggs & Wall, of London, shows an "Airtight Lamp, with Copper Solid Top Enameled with Porcelain."

This lamp as seen from the cut is an entirely new departure in incandescent street lighting, as the glass tops often get broken by heat, changes and accident, which result in many instances in breaking mantle and glass also. This lamp is designed especially for the chimneyless incandescent street lamp now being brought out on the market, which is said to have a greater illuminating capacity than any other now made.

This top is made of cold rolled copper, white enameled underneath, which gives a powerful reflector, with air ventilation on top as shown, avoiding accident; no glass to break and the lamp cannot blow out during a storm.

Mr. Collins—What is the name of the 240 candle power incandescent burner?

Mr. Hollidge—I think that the powerful light shown in this wrinkle is the Kern light.

Wrinkle No. 14 shows more specimens of the handiwork of Messrs. Biggs & Wall. The matters shown are "Pressure Pumps for Service Cleaning in Smaller Sizes."

These pumps are especially designed to be operated by one man, being small, but very strong and powerful. One man can operate these pumps in lamp or other service cleaning, and they can be placed in the tool bag and carried without trouble.

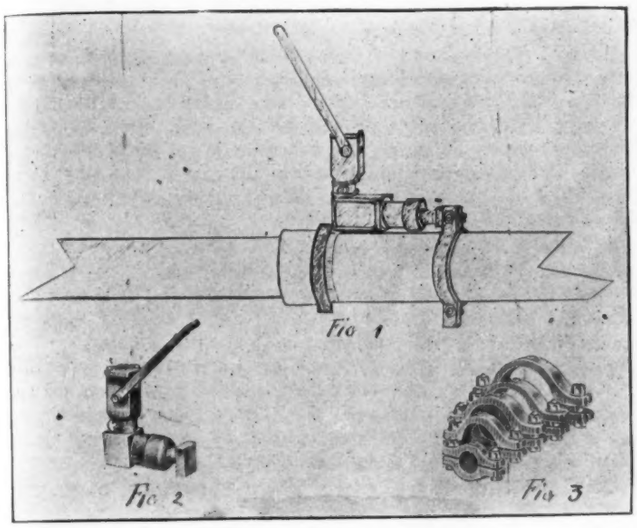
The larger size of pumps now used by us are bulky, and in many instances require two men, one carrying the pump. The pattern shown, however, entirely dispenses with one man's labor, besides being more handy to manipulate.

Figs. 1 and 2 show pumps for lamp service, and Fig. 3 for heavier work.

Wrinkle No. 15 is contributed by Mr. L. F. Fogg, of the Bay City Iron Works, San Francisco, Cal. His description of it is as follows:

The inclosed wrinkle represents a gasholder with concrete bottom, and was built for the Red Bluff (Cal.) Gas and Electric Company. It is a gasholder and water tank combined, without an iron bottom, saving that expense, and it will be seen that the bottom edge of the water tank is set in concrete to save the expense of the iron bottom.

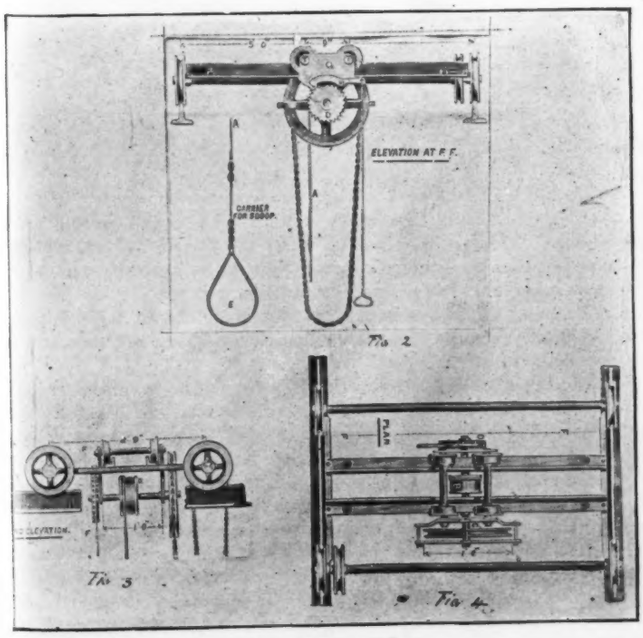
The bottom edge of the water tank is set in concrete for about 12 inches from the edge, making an excellent foundation and absolutely watertight, and giving every satisfaction.



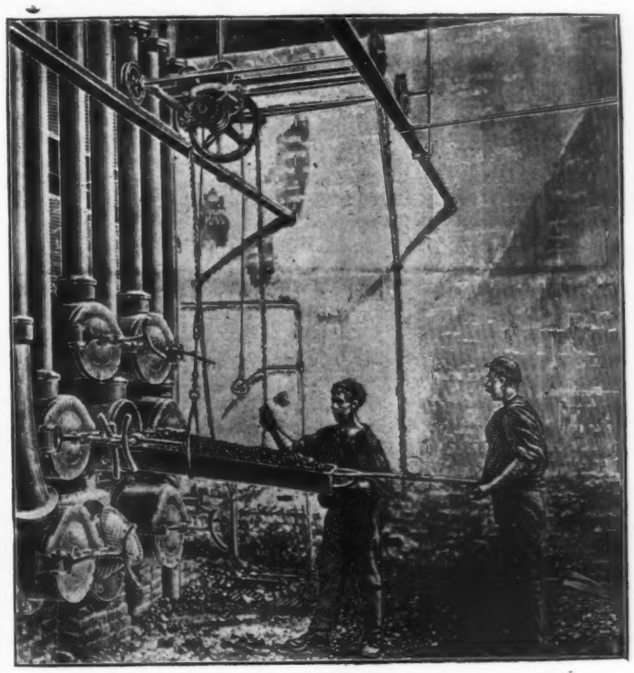
Wrinkle No. 9.

Wrinkle No. 10.

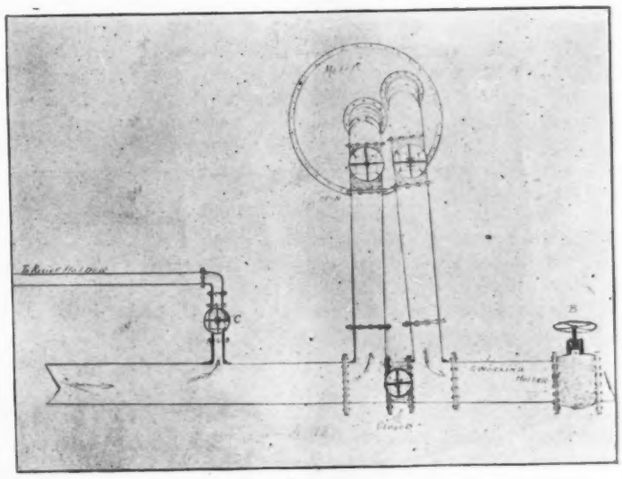
Wrinkle No. 13.



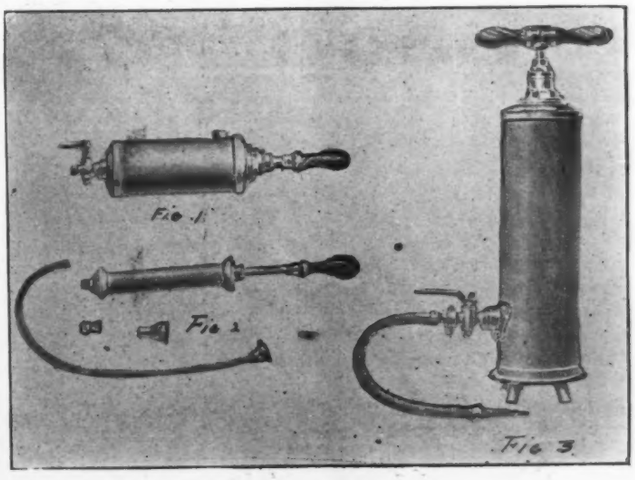
Wrinkle No. 11.



Wrinkle No. 11.



Wrinkle No. 12.



Wrinkle No. 14.

Mr. Clements—This was built for our works at Red Bluff, where we have a blue clay soil that gives a firm foundation. It is on the side of a hill and the upper portion of it is at the depth of 3 feet. At the lowest point it goes to a depth below the surface of the ground of only about 6 inches, so that there is very little to hold it excepting the concrete. Mr. Fogg completed it in January. We felt a little dubious as to the result, on account of the difference in the expansion and contraction of the two materials, but we have not had the slightest trouble with it. So far it has been doing well. It works admirably, and I cannot imagine anything that would hold water better. There are about 120,000 gallons of water in the tank, all above ground.

Mr. Collins—I believe that method of constructing holder tanks was brought out by Mr. Mayer, and there are two or three large holders built in the New England States under his patent.

Mr. Clements—I do not know, of course, where Mr. Fogg got his idea; but I consider that he has done a very substantial piece of work for us.

Mr. Collins—I think you will find illustrations of it in the GAS JOURNALS. He took out a patent some years ago on the combination of cast iron tank and concrete bottom, dispensing with the usual construction of also including steel or iron bottom.

Mr. Clements—There is a difference of about $800 in the cost of construction of the tanks.

Mr. Lowe—The patent spoken of covers the construction of the tank with partially steel sides and partially concrete. Messrs. Bartlett, Hayward and Company, of Baltimore, Md., advertised a similar construction for a number of years. I believe the expension of iron and concrete is nearly equal.

Mr. Clements—The experience of some engineers is to the contrary.

Mr. Guldlin—It has been found in our holder construction, that you can always protect iron very well by embedding it in a bed of concrete, owing to the fact that the expansion of the two is very close.

Mr. Lowe—I think the question of expansion and contraction enters very little into this case, because the water in the tanks keeps them both at about the same temperature. It would vary very little indeed. My only fear (if I had one at all) would be, that when you came to the telescope the holder (as I believe it is your intention to do at some time), you will find the wind pressure so great as to shake the bottom of your small holder. That is the only possible objection I could see.

Mr. Clements—The holder is built so that it could be telescoped at some time if necessary.

Mr. Fogg—I should think that there would be such a body of water that the wind pressure would have no effect upon it.

Mr. Guldlin—I think there would be danger from wind pressure compared with the weight.

At this point a motion to adjourn to 2 P.M. was adopted.

SECOND DAY, AFTERNOON SESSION.

The meeting was called to order by Vice-President Clements at 2 P.M.

The Vice-President—Gentlemen, as President Adams is absent unavoidably he asked me to call the meeting to order. We will resume the work of considering Editor Hollidge's interesting budget of Wrinkles.

Wrinkle No. 16 is contributed by Mr. W. M. Parker, of the Bellingham Bay Gas Company, New Whatcom, Washington. His description of the matter is as follows: The purpose of this wrinkle is in moving a gas main to save the unnecessary expense of taking apart and relaying. The following are the particulars:

We have one of our principal street mains passing under a bridge that needed re-construction. The City Engineer ordered us to move this main. How it was done may thus be told.

A A A A, 12-inch by 12-inch stringers, were renewed; the main hung under the same on straps *C; B*, roller hangers, were hung over *A A*, the main resting on the rollers, *B; C* hangers were taken off; hangers *J*, *F*, were hung as shown in drawing, then the main was cut where so marked. The main was rolled from hangers *B*, on to double hangers, *J*, *F*, then raised up to 2 feet, and upper rollers placed under the main to hold it, where shown in upper dotted lines. Then the main was shoved over on top of the stringers *A A*. Sleeves *D D D*, were caulked on, thus completing the job.

This main was a wrought iron one and had been in use for about six years at the bottom of the bay previous to this removal. It was thought best not to take it out length by length. This method of moving the main was adopted to save time and material, also to insure the town having gas at night. By referring to the drawing, *H* with the arrow shows the first move, and *I* with the arrow shows the second move, bringing the main into position *G G*. Plain lines show the old position of the main and the dotted lines the new position. This operation was accomplished with four men in eight hours.

Wrinkle No. 17, for which Mr. Geo. H. Hollidge is responsible, shows a "Meter Cock with Side Outlet for Cleaning the Service from Naphthalene without Disconnecting the Meter."

This cock was designed for troublesome services, to avoid the continual straightening out of the lead fitting, where cocks, like those in Fig. 1, or No. 1 in Fig. 3, are used instead of union cocks. Should the service be choked at any time unscrew the plug, insert the pump nozzle and replace the plug. No discontinuing of any nature is required. For persons not desiring to have any cast of that pattern, the cut in Fig. 2 or Fig. 3 will answer, using a nipple and plug, and an ordinary cock as shown in No. 1, Fig. 3.

Mr. Hollidge—I might say that this was designed from the fact of being troubled in some services with naphthalene; and in a small works where we have a number of the old-fashioned meter cocks where the lead is connected without a union joint, it saves considerable trouble disconnecting the meter and straightening out the lead pipe in order to take it off. I thought it was preferable to adopt this method of a cock than to be continually disconnecting from the meter and unscrewing the cock in order to get at the service to blow it out. And as I have repeatedly stated that necessity is the mother of invention, this is the outcome of troublesome services to me. If the plug is kept well greased, or greased once a year, that is all that is necessary. I find that, with continually disconnecting and straightening out the lead, it does not matter how careful you are, there is a continual breaking of the lead.

Wrinkle No. 18, is by Mr. W. M. Parker, of Bellingham Bay Gas Company, New Whatcom, Washington, and it refers to a "Ball and Cock Drip, or Automatic Drip."

In describing it he says this plan is exceedingly handy in draining a large surface of mains, especially laid on wood piling, and in many cases where the high tide submerges the entire pipe line.

Having a large area of gas mains to drain, and the lower end of the same lying below high water mark on the bay shore, it was inconvenient to pump this drip at times. The drawing explains itself. When the tide goes out the ball drops and opens the cock, letting out such water as might have collected in the main. When the tide raises it lifts the ball shutting the cock and preventing the bay water from filling the mains. This arrangement is enclosed in a wooden box which prevents the sand from washing up and covering drip. Holes in the bottom of the box allow the water to escape with receding tides. The return bend as shown in sketch allows seal for the main.

Mr. Clements—Any of you gentlemen who live at Woodland, 200 miles from the Bay, ought to be very much interested in this.

Mr. Lowe—I am sure brother Taylor would find it interesting.

Mr. Clements—Yes; they tell me things are very *low* there.

Mr. Collins—I think any sort of an automatic drip outside of the works limit is dangerous.

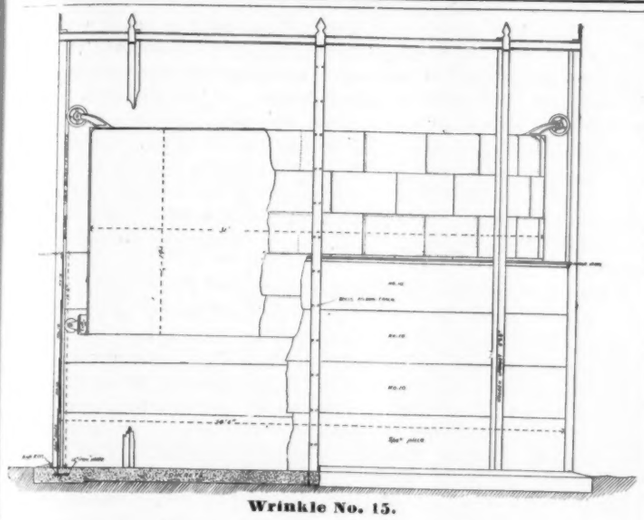
Mr. Hollidge—While this is automatic, I do not think it is to be considered dangerous. When the tide rises the ball rises and closes the cock.

Mr. Collins—That ball and cock, as I understand it, are to drain out the water that leaks into the main at high tide, suggestive of a leaky street main. The fact remains that when the tide is out it is nothing more or less than an automatic drip. Now if you loose that seal it has the same inherent defect as any of that form.

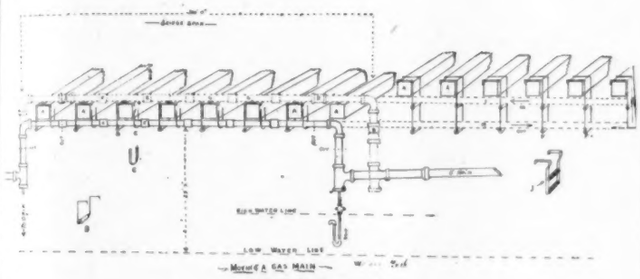
Mr. Petch—I would like to say that I have had one of these drips in use for seven years and that the seal has never blown off, so it cannot be very dangerous.

Mr. Collins—The fact remains that it is dangerous because you have an open end under the water with nothing between you and the water but a seal. Pipes have been known to corrode and some managers have been known to be lax in their inspections. I know that you cannot go to an engineering office of any repute and be advised that it is the right thing to use automatic drips. If I had the trouble I think I could remedy it by putting in cast iron pipes with screwed joints.

Mr. Hollidge—I can hardly see how it would be possible to keep any submerged gas pipe free from collecting water, whether it was of wrought iron or of any other material. It would absorb water in spite of it. I cannot see where you are going to get out of it. Although the probabilities are that a wrought iron pipe will not absorb so much water from the ground as a cast iron pipe, nevertheless they both absorb water



Wrinkle No. 15.



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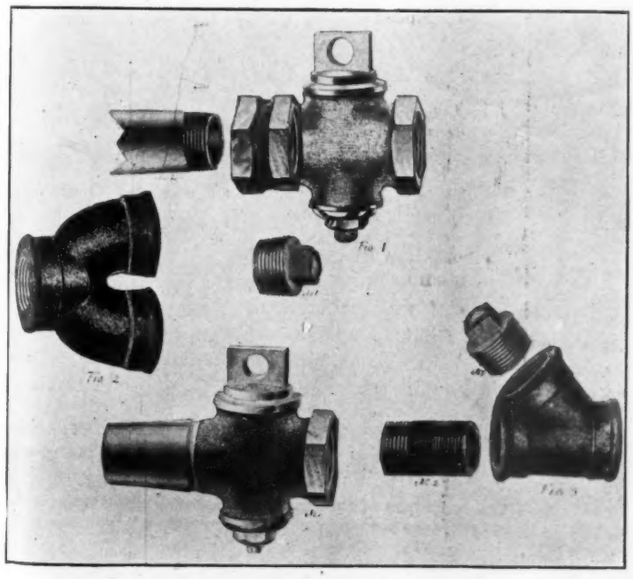
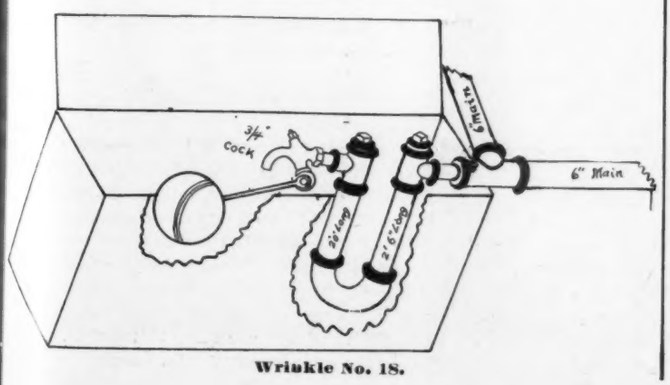


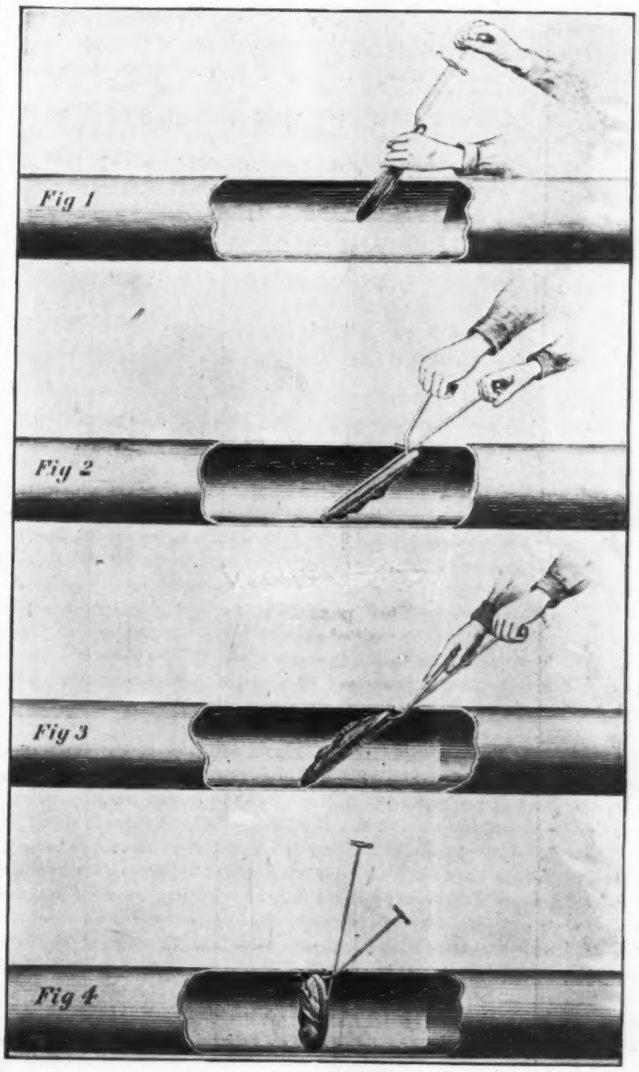
Wrinkle No. 17.



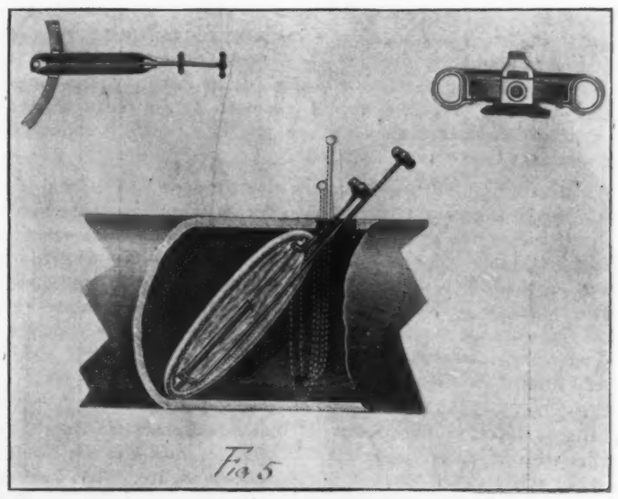
Wrinkle No. 18.

and condensation is always carried on in either wrought or cast iron pipe.

Mr. Guldlin—I understand that this is located at the lowest point. It would be automatic when the tide was out, and it would take very little to seal the pipe. At the same time a high tide would close it and



Wrinkle No. 19.



Wrinkle No. 19.

it would be in the same position as a tight main. It would take care of itself.

Mr. Hollidge—Mr. Collins thinks that when the tide is out it is all right.

Mr. Guldlin—When the tide runs above, if the pipe is tight, you will have no trouble. If the tide is out, the ball drops and, as a natural consequence, that cock is opened, leaving the end of the main unsealed.

Mr. Collins—I must still object on principle. I think my point is well taken that an automatic drip outside of the works is dangerous, in that it has an element of danger connected with it which you cannot afford to take.

Mr. Lowe—Your idea was that if it failed to operate it would fill with water?

Mr. Collins—I think the question of tide is a side issue. If he has a main that would absorb water he should have some system of taking the water out. I would suggest a pump. In regard to wrought iron pipe absorbing water, I would say that it does not disclose that fact on hydrostatic tests.

Mr. Hollidge—There is no pipe made that will not absorb water to a certain extent.

Mr. Collins—Is not that a matter of condensation?

Mr. Hollidge—Whether it is condensation or not the water is there.

Wrinkle No. 19 is communicated by Mr. John J. McKenna, Jr., of New York city, and it describes "A Safety Gas Main Stopper." In the cuts Fig. 1 represents stopper being inserted in the main; Figs. 2 and 3 represent putting the stopper into place; Fig. 4 represents the stopper in place and ready for business. This stopper is made of the best quality of steel springs, properly cushioned and covered with leather and canvass, so that when expanded in pipe its tightness is secured, and, being held in position by the pipe itself, it cannot collapse, burst, or give way by any gas pressure, which has been the fate of many a gas bag. Neither is there danger of pricking from the rough edges of the pipe and causing a collapse at the outset of the work. As a shut-off it acts more like a wooden plug than anything else, as it can be wedged in pipe as firm and as tight to resist almost as much pressure, but, unlike the plug, it can be inserted in a hole tapped in main, which need be no larger than that required to insert a bag.

Its safety is, therefore, assured. Most superintendents will recollect in their experience many an anxious hour spent in making connections or alterations of gas mains, particularly in the larger sizes. The bag may be tight and it may not, and if it is tight what superintendent has not asked himself, "Will it hold until I get the connection made?" Often that which has been half expected comes to pass, and a superintendent generally feels lucky if, with the loss of bags, loss of gas and increase of gray hairs he has been able to get his men out safe with their lives only to renew the job again when his nerves are more settled. Its durability is beyond question, when one considers on the one hand the delicacy of a rubber bag and how easily it is rendered useless, and, on the other hand, the strength and lasting qualities of steel, leather and canvas. It is reliable because its shut-off is positive, and, when properly inserted in pipe, cannot collapse. It is not affected by oil any more than the diaphragm of a meter is affected. Workmen like to use it, as they feel that their lives are in no way endangered. It is quickly operated, as a 24-inch stopper can be inserted, placed in position and gas shut off in 30 seconds after the plug is removed. Compare this with the length of time required to insert and inflate a 24-inch rubber bag! Its simplicity is assured by its construction. Any intelligent man can operate it properly after a trial, using an empty piece of pipe in the workshop. Its economy is guaranteed by the fact that it will outwear any number of gas bags, save gas when making connections and save time and worry.

Wrinkle No. 20, represents a seam pipe connected to the seal pipes in the scrubber and condenser. In order to permit cleaning simply turn on each valve and the steam will drive before it all stoppages caused by the tar. The same condition exists sometimes with the tar pipe from the seals to the well. The steam can also be connected as shown, which will, if stopped up, be soon cleaned by turning on the steam from the valve. Steam as a cleaning agent has no superior in tar pipes, and it prevents one from being daubed with tar if a choke should present itself.

Wrinkle No. 21, by Mr. J. R. Thompson, of Colusa, Cal., is to "Time the Blast and Record the Amount of Water Gas made per Run."

This wrinkle, according to the illustrations shown, is the result of hours of study and labor and much correspondence. It is intended more especially for small works, especially those run without station meters.

A, in Fig. 1, is the dial on which the amount of gas is registered during each run. *B*, in Fig. 1, is the time annunciator, and after the first five minutes will register the minute as the door drops down, showing how long you have run or blasted. *C*, in Fig. 1, is the dial on which the whole amount of gas is registered during the entire time of gas making. *D*, in Fig. 1, is the stack valve in model, with wires attached to the annunciator. *H*, in Fig. 1, is the lever to trip dial *A* back to zero after each run. *I* is a lever to place back the doors of the annunciator after use. *E*, is the desk containing cards in a slip to record each run and blast, and gas made, etc. *J*, is the wire connecting the holder.

Figure 2, represents the machine showing a run of eight minutes having taken place. *B* shows doors, 8 dropped down. Dial *A* shows 1,600 cubic feet of gas made, dial *C* confirms the register.

To operate. First. say we want to blast 10 minutes, consequently we throw open the stack valve, *D*. By throwing the valve open, the wire connected to the rocker of stack valve will start the annunciator at zero, and when the stack valve to the annunciator is dropped, the door No. 10 is dropped, showing the time has expired.

After blasting, both dials *A* and *C* being at zero, by closing down the stack valve *D*, you again bring the hand of the annunciator *B* to zero. You wish to run say, 6, or 7, or 8 minutes. You need not watch the clock, for the annunciator will drop down the door when you close your stack valve, and the holder will rise and the dials *A* and *C* will move, showing how much gas you have made.

To blast again. Throw open the stack valve *D*. This will bring the annunciator *B* to a new starting point, zero again. Then lift the lever *H*, and that will trip the dial *A* back to zero again, as in Fig. 1. Pull lever *I*, to close the door of the annunciator, and your annunciator will register the minute your have blasted, showing eight minutes run or blast as the case may be. Now, suppose after each run you wish to find out how much gas your consumers have burnt during each blast. Just simply watch the dials move back, and sometimes between runs you will find your loss exceedingly great. Take down on a card printed for the purpose, the time of blast, run, oil and gas made and gas consumed. Add the consumed gas to the made gas, after the holder is full, and you will have the accurate amount of your entire make.

Mr. Lowe—What does the first hand register? The rise and fall of the gasholder?

Mr. Thompson—Yes, sir. When the holder goes back the hand goes back. By looking at the hand you can see the amount of gas in the holder.

Mr. Lowe—I understand that the dial would conform to each gasholder.

Mr. Thompson—Yes, sir. This dial is made for a holder having a capacity of 7,000 feet. They could be made for any size.

Mr. Lowe—I understand you keep a record of your runs?

Mr. Thompson—Yes, that is the special value of this contrivance—to keep a good report so that I can at any time know what I am doing. That is, the average number of minutes that it takes to raise my heats and make certain quantities of gas.

Mr. Lowe—Does it get out of order at all?

Mr. Thompson—No, sir. I have had no trouble with it. This piece of work is very crude and was intended only to convey the general idea.

Mr. Lowe—The operation of the stack valve works the timepiece and the holder works the valves?

Mr. Thompson—Yes, sir.

Mr. Lowe—What would be the approximate cost of construction?

Mr. Thompson—I could not tell, because I do not know how long it took me to make it.

Mr. Lowe—At a rough guess, what could you install them for?

Mr. Thompson—I would not like to state that.

Mr. Lowe—For $100?

Mr. Thompson—Yes; I would like very well to install them for $100 apiece.

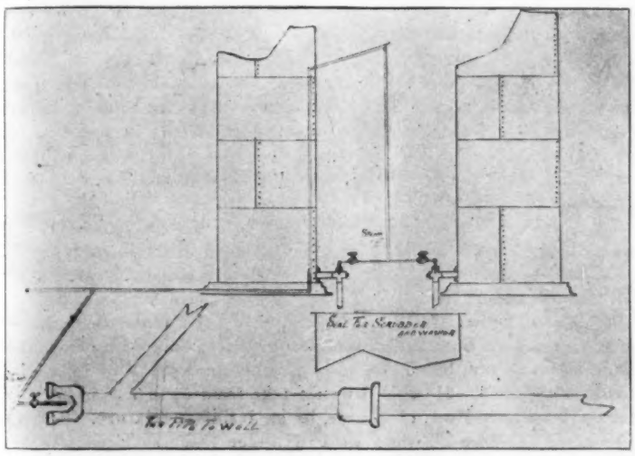
Mr. Lowe—Then you have not put any price on the device at all?

Mr. Thompson—No; I did not make this for sale. Another little wrinkle I would like to mention. I suppose most of you have seen a faro case for dealing cards. We used to have our reports made out on large sheets. Now everyone of you who has had to operate a plant knows how difficult it is to turn out a decent looking report when one's hands are all covered with grease. I reduced our reports to the size of an ordinary card, and by placing a deck in this little contrivance there was enough to last six months. It is not necessary to touch them at all. The cards can be slid out the same as out of a faro deck.

Mr. Powers—I move the thanks of the Association be tendered to Mr. Thompson for exhibiting this very ingenious little instrument. I think it will be a success and a benefit to gas men in general. I hope also to him. (Carried.)

Wrinkle No. 22, is by Messrs. Biggs & Wall, of London, England, and refers to "A Lamp Cock, with Side Outlet, for the Purpose of Blowing the Service without Removing the Lamp."

This wrinkle, as seen in Fig. 1, showing the plug, is for troublesome services caused by stoppages. It is necessary for the fitter to remove the Welsbach lamp, resulting in many broken mantles in removing. This is entirely obviated. Simply unscrew the plug and insert the nozzle of the tube from the pump.



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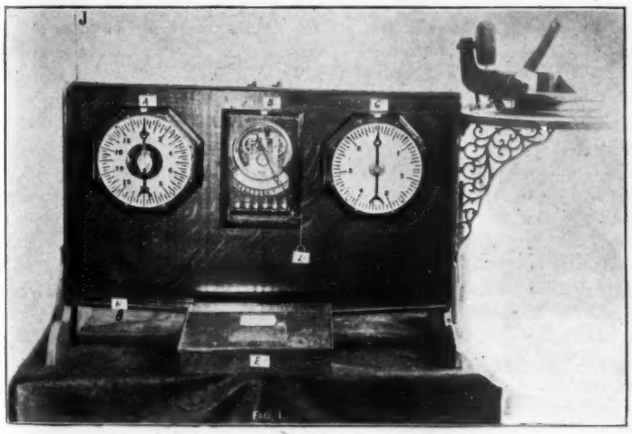

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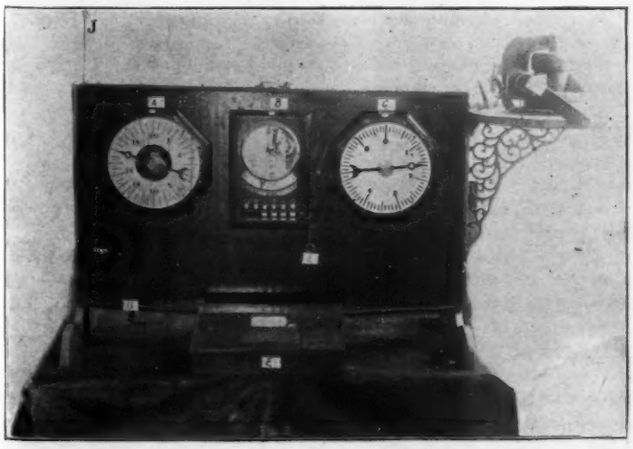


Wrinkle No. 21.

Fig. 3 shows the Welsbach lamp and cock in use; Fig. 2, with Argand lamp.

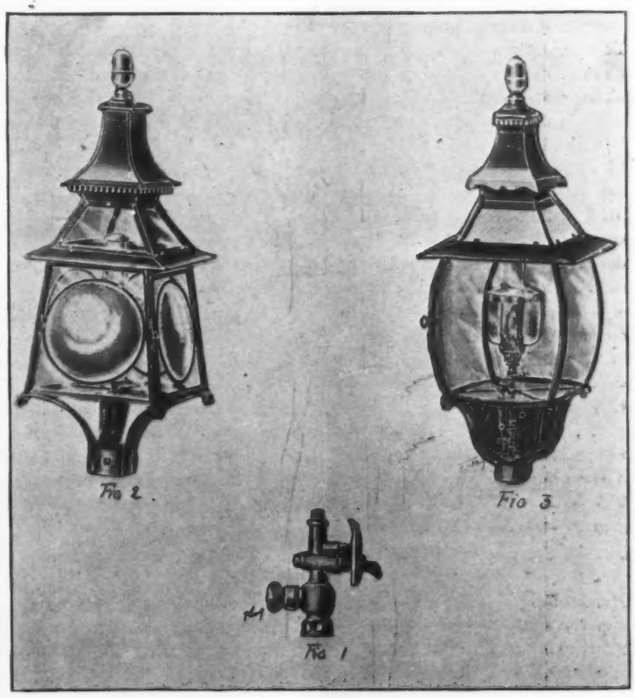
Wrinkle No. 23, is by Mr. W. M. Parker, of New Whatcom, Washington. It describes an "Automatic Drip for Gas Main."

The following will give a very clear account of its manipulation, and though not entirely new, it is decidedly a very handy device for such work, and saves much labor.

Explanation.—An old idea used for a new purpose.

The drip in sketch catches the condensation from about 1 mile of 6-inch street main, 1,000 feet of which is exposed under a viaduct, causing irregular filling of the drip at the lower end of the main. To relieve this trouble I have adopted the style shown in the sketch. The drip is made of 1-inch pipe, return bends and stopcock.

The entire drip is submerged at high tide, filling the drip to high-water mark. When the tide recedes the pipes retain enough water to seal the drip.



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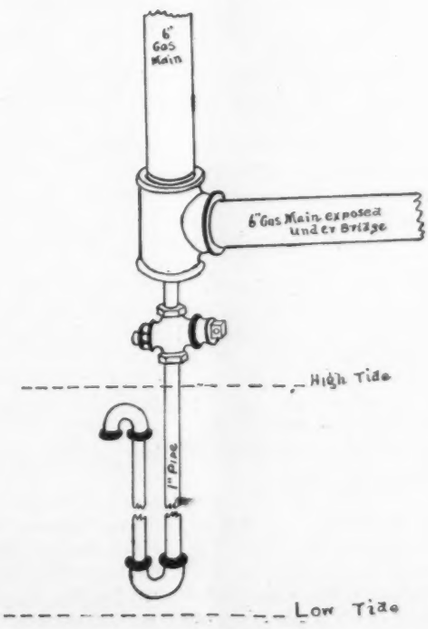


Wrinkle No. 23.

Wrinkle No. 24, by Mr. Geo. H. Hollidge, refers to a "Cheap Extension Head for Service Cock."

In many instances after the services have been laid the grade is raised, leaving them under the sidewalk several feet. Take a piece of ¾-inch pipe, forge the end to fit the flat-head cock, drill a hole for a stove bolt, put in a small piece of iron to fill the other end of the pipe, and forge it the same shape to fit your key. Drop the pipe down through the box over the head of the cock, put in a stove bolt through the hole in the pipe and cock and screw up the bolt tight.

Wrinkle No. 25, shows "A Bushing for a Cross Bar after the Thread is Stripped Inside."

When a crossbar is stripped inside and the hole is too large, bore out the hole to say 1¼ inch or 1½ inch, have a thread cut in a bushing made for that purpose, insert it into the crossbar and screw up the set screw. It will answer just the same as new. Figs. 1 and 2 represent the bushing; Fig. 3 shows the bushing in place.

Wrinkle No. 26, by Mr. Geo. H. Hollidge, represents "The Mixing Chamber of a Gas Cooking Stove."

This wrinkle as shown will serve to illustrate by what method a gas consumer can be treated in order to promote gas stove business. Gas cooking stoves are in many cases placed into homes and the mixing chambers are in many instances as wide open as in Fig. 4. If the stove is left like this a large bill is the result. Why? Because too much cold air is carried to the burner, consequently less heat is given and it takes more time to cook. In many instances mixing chambers are left as in Fig. 2, almost as bad as in Fig. 4. This must be avoided if you want to do a large gas stove business, where gas is a costly article. In order to demonstrate the feasibility of this wrinkle is a practical experience of the facts facing us; hence, try our burners on a cooking stove and regulate the air mixers, as in Fig. 1, leaving about one-third open, then leave the other mixer as in Fig. 2 or 4; light them and place a utensil of the same size on each with the same quantity of water and watch the results. The flame on Fig. 1 will be 1½ inches in height, and in Fig. 2 about ⅛ of an inch high. A greater heat will result from Fig. 1 and obtain all the air that is necessary. If this is watched in cooking stoves we shall not get so large gas bills; but we had better have smaller bills and a healthy cooking stove business and consumers satisfied, than have half the stove trade and that half continually finding fault with large bills. Give it a trial and see.

Mr. St. Clair—Is it a fact that when the flame gets too little air it will be red?

Mr. Hollidge—That all depends upon circumstances. You have to gauge the shutter according to the size of the place where the stove is set. If it is open too far you will find that, by putting the utensil of water over it and one over a burner that is properly regulated, the regulated burner will boil the water in half the time. Where gas is a costly thing, as it is in small country places, people find when they receive their bills that they have burned a great deal more than they anticipated. We either have to reduce their bills arbitrarily or lose their custom, and we cannot afford to do that kind of a business. I find it to be a fact that the trouble is generally due to open shutters, and where the shutters and air mixers have been properly regulated I have no trouble whatever with the bills. They meet the approbation of both consumer and manager.

Mr. Taylor—Whenever a gas stove is placed, is it not the general custom of gas companies to regulate it?

Mr. Thompson—I believe it is. I get stoves with the shutters in all sorts of shapes.

Mr. St. Clair—The question is how to get the right idea of how to adjust them.

Mr. Collins—Mr. Hollidge's wrinke could not be worked satisfactorily in Seattle, for the reason that every stove that is set up has to be adjusted to the particular conditions. In some places we have a plentiful supply; in others we may be compelled to take from a temporary run. We have hilly districts and low districts. The man who sets the stove regulates it when it is connected and the gas turned on. All the stoves we get have adjustable shutters.

Mr. Hollidge—That is just what this is for; to adjust the amount of air going into the shutter.

Mr. Rice—Do I understand that this shutter can be readily adjusted? For instance, you know that many of our most efficient burners will pop when you light them, and yet they are the burners that give the best combustion. I did not know but this was something that could be adjusted by the cook when she lighted it. I would like to ask, too, what percentage of air it takes to produce perfect combustion?

Mr. Hollidge—That depends very much upon the size of the room. If it is a large, cold room, you do not need so much air in your mixing chamber.

Mr. Rice—Do you think we generally get enough air?

Mr. Hollidge—Generally too much; that is the trouble.

Mr. Rice—Some burners, as I said, will pop in lighting unless you cut off the supply. If they were adjustable, so that you could turn them backward and forward every time they were lighted, they would be perfect.

Mr. Hollidge—As a rule the average housekeeper pays no attention whatever to the mixing chamber. They simply light the burner and leave it, and where you find a stove that is popping you will find in 9 cases out of 10 that there is too much air.

Mr. Rice—The more air we admit to the burner—that is, up to a certain percentage—the greater flame we get. You take a burner that never pops and you will get a purple flame. With the burners that do pop, if you just shut off your air when you light them your burner will light, go right on and not pop at all. This could be done if we had an adjustable shutter that could be adjusted every time the burner was turned on. Now there are a great many burners in use that are condemned simply for the reason that they pop. If you had a shutter that would check the air when it was lighted, you would never have a complaint and you would get the most intense heat.

Mr. Aldrich—When the gas lights back into the gas chamber, is it not because of the fact that there is too little gas in the burners?

Mr. Rice—I should say it was because there is too much air.

Mr. Hollidge—There is either too little gas or too much air.

Mr. Rice—The point is that with a majority of burner constructions we want more air than we can ordinarily get. I do not know whether I am right or not, but I got the information from a party who is thoroughly posted. He said it would take from 5½ to 7 parts for perfect combustion. Now, of course, by an intimate mixture, we could burn one-half more air than we can under ordinary circumstances. Our mixers do not seem to be perfect.

Mr. Lowe—I have spent a great deal of time investigating this subject, and I will say that Mr. Hollidge is strictly correct; we do get entirely too much air. The question naturally arises, why put air in at all? If you burn a gas with its ordinary flame, providing you do not disturb the flame, you get perfect combustion. If you mix air with it you do not get any more perfect combustion. By mixing air you absolutely cool the flame; you decrease its efficiency. The reason why we mix air, is so that we can burn a sufficient amount of gas to do our work and burn it within a reasonable space. The ordinary flat burner will burn 15 feet of gas in an hour. If we were to burn that flame in yellow gas, it would flame up 8 inches high and would condense on the bottom of the cooking utensils. If we place the cooking utensils above the flame, so that the bottoms of the utensils barely touch it, we get the most efficient work. To do that we have to mix air with the gas in order to pull the flame down. In order to arrive at just what was the best gas mixture I made elaborate experiments, and found the best way to adjust the ordinary stove to-day is to turn the air on until the fine, yellow tip just shows in the gas. That is an indication at least that you have not too much air there. If you pass that point and come down to the blue and green cone, then you are seriously interfering with the combustion of your flame. You are cooling it down. I think there was an advantage of 7 or 8 per cent. in efficiency at the point where the yellow tip was still showing on the jet over what it was when it was turned to the green cone. I obtained these results by heating a given quantity of water. My experience has been that the least air you can get in to do the work is the most satisfactory. My practice is to adjust the gas burner so that the fine yellow tip still remains, and if every gas man would take the trouble to examine into the matter he would find that this is absolutely correct. In the railroad shops at Santa Barbara they use gas made by a local company. The flame ordinarily is very short. It is made so by a heavy blast of air. The more air you put in, the more gas you can consume. When you draw it in by the suction of the gas pressure you cannot get very much air, consequently the time comes when you must use a forced blast to do it. In that way you can burn more and more gas, and with the additional blast you can hold the flame exactly the same length, but proportionately less heat is obtained than if the same amount of gas could be burned with a yellow flame.

Mr. Aldrich—With us when we have a kicking gas stove customer and send a man to adjust the stove, we tell him to open the air chamber and let more air into it. I would like to know whether that is the right thing to do?

Mr. Lowe—It might possibly be if you have not enough air already in.

Mr. Aldrich—I believe you will get perfect combustion in a modern gas stove by having one part of air and three parts of gas.

Mr. Lowe—That depends upon what you call perfect combustion.

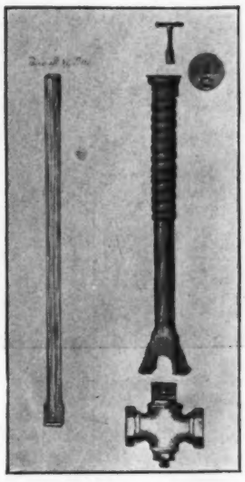
Mr. Aldrich—It is my opinion that most of the trouble is caused by mere carelessness. If there is too much gas it will end by being illuminating gas and be deposited as carbon on the utensils.

Mr. Hollidge—Whenever I find a customer kicking about his gas bill, when I know he has a gas stove, I do not send anybody there but go myself and look all over the stove to see whether the shutters are open too wide. If they are I find in some instances that the boys had been there prying them open with a pair of their mother's scissors. I simply close them up again and retire. But in most cases—I might say 99 per cent.—where we have had trouble with gas stoves it has come from the mixing chambers being too wide open, just as Mr. Lowe has said.

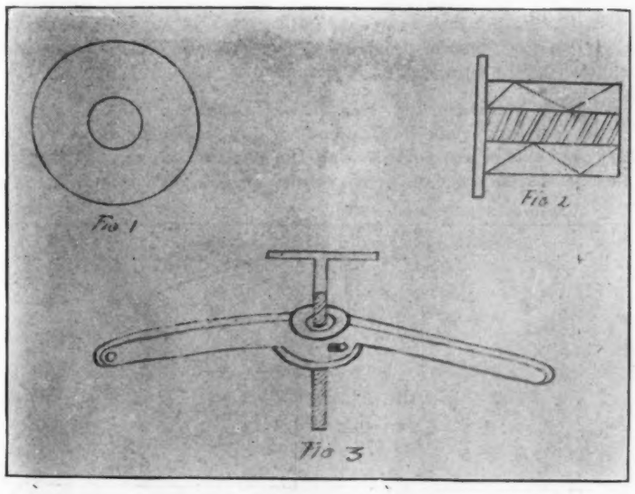
Mr. Lowe—My experience has been that every gas stove is a law to itself. We must take gas stoves as we find them. When we get a gas stove we must do the best work with it that it is capable of doing. Every stove must be adjusted. If a man puts in a stove without adjusting it that stove is bound to be unsatisfactory. After adjusting a stove properly it will give the consumer satisfaction beyond a doubt; but the important point to know is just when you are doing the best work with a given amount of gas. In order to determine that I went, as I have said, into elaborate experiments and my experience is that the very least air you can get in the gas to do the work satisfactorily the better the results will be.

Mr. Hollidge—That is exactly my result.

Mr. Lowe—If you adjust the burners just so that the flame will not touch the bottom of the utensils, that is the best working point. The instant the flame touches the carbon begins to condense. You must get the flame away from the utensil for economical work, but get as little air in it as you possibly can. The operation of the Welsbach light is familiar to all of us. You know that in turning the air on in a Welsbach there is a point that gives the greatest amount of light, and if you turn on too much the light is lessened. That would seem to sub-



Wrinkle No. 24.



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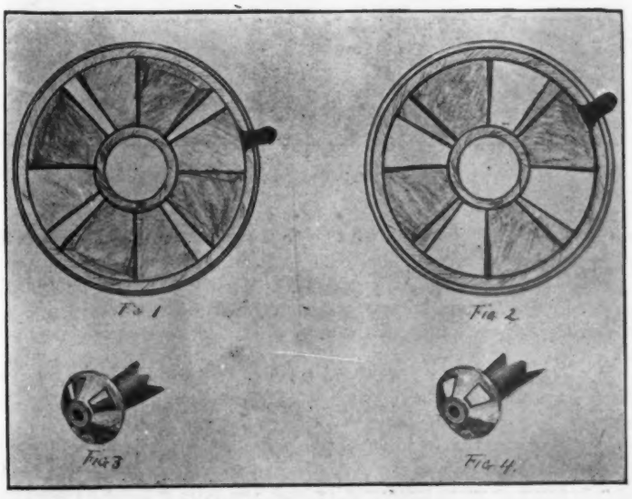

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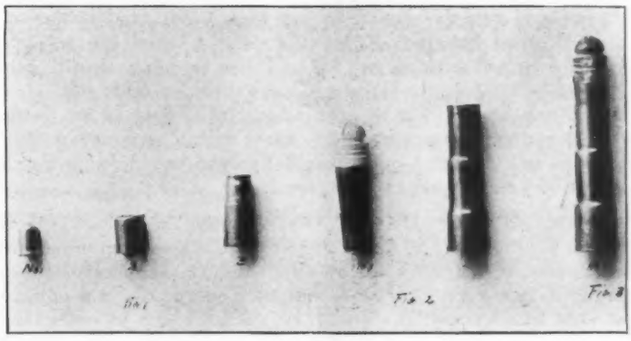

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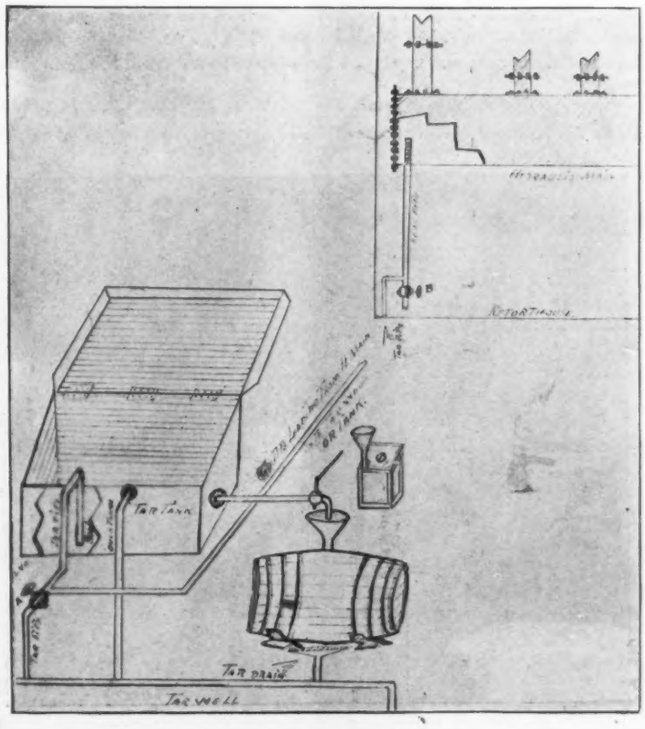


Wrinkle No. 28.

stantiate what I have said about the possibility of getting in entirely too much air.

Wrinkle No. 27 describes an "Automatic Gas Check." This gas check, as shown in the model and cut, is small and simple, easy to manipulate, and will regulate any number of lights, and all floors of the building will be equalized, and all burners will be the same in size and yield a steady flame. It is a well known fact that while a large governor will regulate the lower floors of a building, it fails to regulate the upper ones. Consequently this small device will regu late all alike, and entirely dispense with the costly governor at the meter, and the cost of these small governors puts them within the reach of the poorest housekeeper, which of itself bespeaks a heavy sale of the governor to gas consumers. In the sketch Figs. 1, 2 and 3, compose the check. In Fig. 1, 2 is the governor fitted together. No. 2 in Fig. 2 is a common pillar. No. 1 in Fig. 3 is the governor fitted into the pillar ready for screwing on to the fitting. The governor, No. 1 in Fig. 2, is simply pressed into the pillar, No. 2, Fig. 2, with the finger and thumb, and the governor is put in or taken out without any tools whatever and is perfectly gas tight.

Wrinkle No. 28 is by Mr. Geo. H. Hollidge. This wrinkle was brought out to obviate the necessity of pumping small quantities of tar, taking the entire attention of one man at a time, when it would be impossible for him to leave other work of more importance. The seal pipe from the hydraulic main is cut above the seal, and a tee put in, with valve or cock below the tee. The pipe is laid from the tee to a suitable place in the yard. Then place your tar tank and convey the pipe into the tank as shown and seal it. Close valve *B* and close valve *A* and your tank will soon fill. When filled open the valves again, and repeat as often as you require your tank filled. The overflow will carry off all tar from the tank into the well. A barrel can be placed under the faucet as shown, and the man can be going on with other work while watching the barrel and completing his other duties. As sometimes a barrel will be brought in to be filled just as his charges want to be drawn, consequently he cannot wait; his work demands his attention, and this wrinkle will materially assist him in completing his task without staying to pump the barrel.

Wrinkle No. 29 is by Mr. M. C. Osborn, of the Yuba Electric Power Company, of Marysville, Cal. This wrinkle, as seen from accompanying sketches, is a curtain made of enameled duck, completely covering the engine in the generator room to make it dust proof. The object of the plan is to prevent the dust from the stack and generator from accumulating and coming in contact with the engine, as the extremely fine carbon acts as an emery on all movable and delicate parts of machinery, and consequently wears out good engines long before their time. The curtain acts as a preventive, where space is limited and the engine is located in the generator room. It also deadens the noise of high speed engines and separates the blower room from the generator room.

To Make and Operate.—Obtain ½-inch pipe and measure off space to allow curtain to drop clear of all moving parts, making as it were a

Wrinkle No. 29.

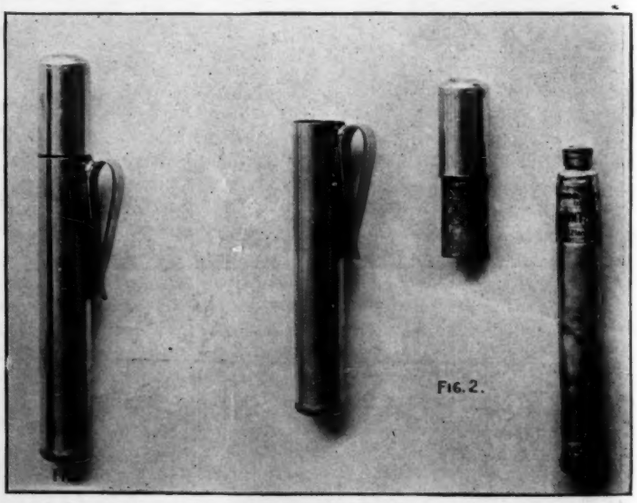
Wrinkle No. 29.

room. Elevate the pipe above the floor as high as required and suspend it. Have your curtain made with rings to slide on the pipe and a center piece of pipe across to prevent the top curtain from sagging down, as will be observed in the sketches. Fig. 1 shows the curtain open; Fig. 2 shows the curtain drawn, enclosing the engine and making an entirely separate room.

Mr. Guldlin—I would suggest that an equally satisfactory arrangement could be obtained by using a few boards and a couple of window sashes, which would besides be permanent.

Wrinkle No. 30 is also by Mr. M. C. Osborn.

It is very unique and fills the bill for gas fixture or stove work, to carry red lead or any color to suit the purpose. It can be fitted into the case as seen in the cuts, and carried in the vest pocket, the snap



Wrinkle No. 30.

hooking on the vest. The case prevents dirt or oil from coming in contact with one's clothes.

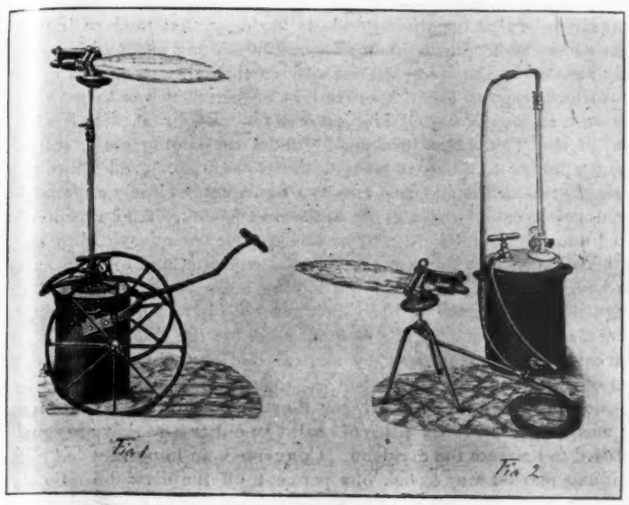
Fig. 1 shows the entire outfit closed; Fig. 2 shows the parts separated.

Mr. Lowe—Do you know whether they are on the market?

Mr. Hollidge—Not that I know of.

Wrinkle No. 31 was forwarded by Mr. Edward Robinson, of New York city, who describes a "Powerful Blast Lamp for Burning Out Cast or Wrought Iron Pipes, or for Light During Night Work."

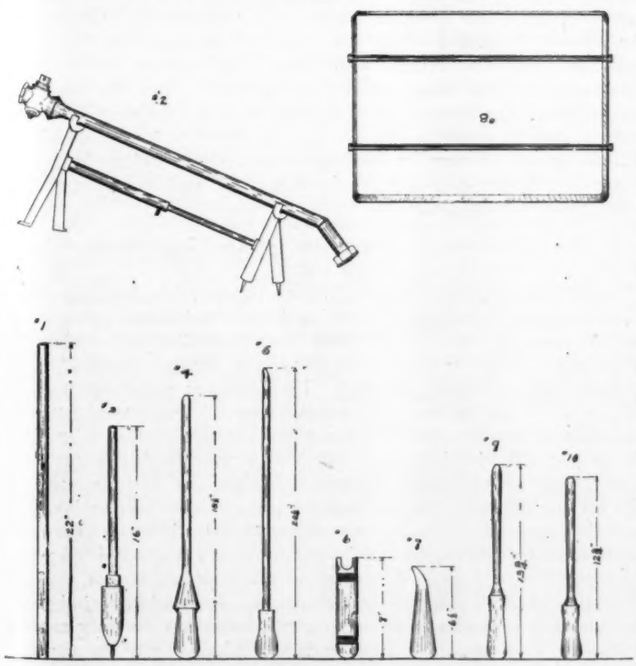
In taking apart large joints of pipe a fire under the joint is generally resorted to, and, in cast iron pipe, the excessive heat causes the heavy pipe to crack in some instances, or else the pipe is gouged round and bursted off. This flame will burn out all the lead quickly, long before



Wrinkle No. 31.

the pipe is brought to a great heat, thereby saving the cutting or splitting of the pipe. Providing a light is required for men to carry on their work during the night, this lamp will give light also, thereby answering for several purposes.

Winkle No. 32 is contributed by Secretary Britton. Describing it he says: This wrinkle consists of a series of tools designed for expediting the manufacture of meter connections. Fig. 1 is a device for soldering two pieces of lead together, preserving an even joint and preventing any burr occurring on the inside; Fig. 2 is an adjustable device for holding connection while soldering on stopcock or union, allowing



Wrinkle No. 32.

free use of hands of workman; Fig. 3 is for holding socket on inlet connections to permit easy soldering without waste; Fig. 4 is for wedging openings of connection to any desired size for insertion of stopcock, etc.; Fig. 5 is for straightening out kinky lead connections by driving through while hammering on some resisting substance; Figs. 6 and 7 are devices for bending end of connection around spur and union, when desired to place same on side or near end of connection; Fig. 8 is a pan with removable bars for drippings to catch all solder in a clean place when taking meters apart or putting them together; Fig. 9 is for wedging opening of lead to proper size for stop cock; Fig. 10 is for wedging opening of lead to proper size for socket.

These tools are made of oak and are designed for 3-light connections. Larger sizes can, of course, be made for other sizes of connections.

[To be Continued.]

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, Aug. 10, 1899.

The Self-Igniting Gas Jet.—The Price of Gas in London.—The Sliding Scale.

One of the most interesting features in the advance of civilization is that there is no finality. The supply of one "need" creates a demand for half a dozen more, and one invention that supplies a long-felt want prepares the way for an entirely new line. The savage, living in the primeval forest, is satisfied with a couple of yards of cotton cloth and material for his next meal. But the inhabitant of the modern town must have his water supply, gas, electricity, telephones, messengers, etc., and withal is much more discontented and inclined to take to a novelty of a trouble saving order. We have gone on for half a century, lighting the gas burner with a match, and never felt the hardship. At the earlier part of that period, indeed, the simplicity of the operation was considered a great advance on previous methods. But the advent of the electric light has altered this. It has been now discovered that the time-honored lucifer is a dangerous and troublesome article, and that the gas jet must be made to light up by the pressing of a button. This apparently large order is in a fair way of being filled. Apart from ordinary lights there are special purposes for which a self-igniter would be a great advantage. For the lighting of large buildings, for the ordinary street lighting of towns, for railway stations and places where large numbers of people congregate, for busy shops and factories, and other localities where the man with the torch is a necessary nuisance, the self-lighter is something more than a mere servant to the fads of modern civilization. In any large building it is an advantage to be able to dispense with a torch, although the same can be so enclosed as to be fireproof. The pilot light is very useful in its way, but it is only a bastard self-lighter, and apparatus depending upon other sources of energy, such as an electric battery, is not much better. It was with much satisfaction that, one day last autumn, I had the burners in our show room fitted with a self-lighting appliance, requiring the simple turning on of the tap to insure ignition. A dozen of these were put on and are still in use. The principle of action lies in the fact that if a jet of hydrogen gas is allowed to play upon a fragment of platinum black the same becomes hot enough to ignite the gas, and coal gas contains sufficient hydrogen to bring about this result. The igniters have been operated with fair success. Occasionally one becomes sluggish in action, but this is remedied by shifting the platinum fragment, so as to expose a fresh surface to the gas. I now learn that a trial is in progress, with satisfactory results, of the self-lighting apparatus as applied to the lamps on one of the platforms at an important railway terminus in London. This apparatus should receive the support and encouragement from gas companies as likely to be of assistance in extending their business. Not only are lights situated in locations where it is inconvenient to reach them with a torch or taper, as in the front of a large shop window, but many are only required at intervals, and the self-igniter comes as a great improvement upon the plan of turning down to a glimmer.

Last month some reference was made to the Parliamentary inquiry into the price of gas in London, having special reference to the great difference in prices charged by the Gas Light and Coke Company and the South Metropolitan Gas Company respectively. Since the Committee has been sitting this difference has been further increased. The first named remain stiff at 3s. 0d., and the second have reduced to 2s. 1d. per 1,000 cubic feet. The inquiry has been closed, and the report of the Committee has been issued. It is useless to disguise the fact that the conclusions arrived at, afford a certain amount of support to the charges made against the Gas Light and Coke Company by Mr. Geo. Livesey. In reviewing the history of the gas question in London and the special Parliamentary regulations that have been from time to time enacted for the protection of the consumer, the Committee conclude that the principle of the sliding scale, coupled with the auction clauses is an excellent one, and should be maintained. The sliding scale starts with an initial price and an initial rate of dividend—say 3s. 9d., and 10 per cent. Then for every 1d. per 1,000 cubic feet charged above or before that initial rate, there must be a decrease or increase of ¼d. per cent. in the rate of dividend. The Gas Light and Coke Company are now selling at 3s., and may therefore divide $10 + \frac{2}{4} = 12\frac{1}{2}$ per cent. If they sold at 4s. they could only divide $10 - \frac{4}{4} = 9\frac{1}{2}$ per cent. And the auction clauses provide that all new issues of capital shall be offered for sale by public auction, the premiums, if any, to go to the capital account and bear no interest. For

example, £100 value of 5 per cent. stock would perhaps realize £130. The £130 would be carried to capital, and the interest paid on it would be £5, or less than 4 per cent. The advantage of this arrangement from the consumer's point of view is obvious. It tends to reduce the sum required for dividend on capital, and therefore gas can be sold cheaper. But after reviewing at great length the evidence submitted before them, the Committee say: "After giving due weight to the reasons offered by the Gas Light and Coke Company in explanation of the higher price charged for their gas, they are of opinion that the affairs of the Company have not been well managed. The intention of the sliding scale was to give the consumers a special interest in economical administration, while the control was left exclusively in the hands of the Company. Hence there was an implied obligation on the part of the Company that their affairs should be administered with due care and management. Your Committee have arrived at the conclusion that this has not been done. Hence the intention of the Parliamentary bargain which was in effect made has not been realized by the Company, and thus the benefit to the consumers which was contemplated when the standard price was fixed nearly a quarter of a century ago has not been obtained."

After disclaiming any attempt to dictate to the Company as to questions of purchase of coal, disposal of residuals or other matters connected with the carrying on of the business, the Committee pass on to suggest that a small reduction of the standard price, coupled with a secondary sliding scale for increasing or decreasing dividends, would act beneficially towards securing due care and economy in management, and if it could be so devised that, while it would stimulate those Companies which have not succeeded in bringing their prices to a low level, to greater endeavors to that end, it would not interfere with those Companies which had already attained low prices. But this new scale should only apply to future legislation, when applications for new capital are made. The Committee recommend that whenever any of the Metropolitan Gas Companies apply for extension or alteration of capital, the standard price shall be reduced to 3s. 3d. to carry the standard dividend of 10 per cent., that the existing scale of increase or decrease of dividend according to price shall be maintained, and that a secondary or additional scale permitting of an increase or decrease of ¼ per cent. for every complete 3d. above or below the standard price should be imposed. They also recommend that capital powers should not be granted for more than five years, so that the Companies may have to come before Parliament at intervals not longer than that period, and thus afford opportunity for such revisions of the sliding scale as circumstances may render necessary or desirable. And that old or obsolete capital should be redeemed by sinking fund or otherwise.

The evidence offered at this inquiry is of a very informative and suggestive character, and one point that comes out very clearly is the possibility of being too big. The worship of mere magnitude is a very general thing. Men aim at enlargement at entering their business and their possessions. A bankrupt, if he deals in large sums, is admired as a clever man. This tendency has led to amalgamations and combinations, each one of which adds in a greater ratio to the total load to be carried. Apart from all special circumstances, we have it on the authority of the Parliamentary Committee that the affairs of the Gas Light and Coke Company might have been better managed. When we remember the array of scientific, engineering and administrative talent included in the staff, comprising the pick of the whole land, this conclusion is surprising. And I think that the explanation of the matter may be found in the fact that the quantities of materials to be bought, or residuals to be sold may frequently be a drawback, and that half or one quarter of such quantities could be dealt with to better advantage. The board of directors must also be dependent upon a very elaborate beaureacratic system, which is a different thing from the more or less personal touch which is possible in a smaller affair.

There is no difficulty in meeting with persons competent to take the control of a small concern. But with the large one our enormous responsibility comes upon the chief officials, and they would be more than human if they did not sometimes make serious mistakes. In the gas industry there is entirely a point at which magnitude ceases to be an advantage, and if this is greatly exceeded it becomes a standing source of danger. Amalgamation may be a good thing, but like all other good things may be bought too dearly. And this is probably the explanation of the fact that the Gas Light and Coke Company are unable to sell gas as cheaply as their smaller neighbors.

The sliding scale was no doubt intended to give the companies some advantage, but not to the tune of three or four per cent. increase of dividend. It was urged that a fixed rate of dividend offered no inducement for economy of management, and the Committee are evidently of opinion, after nearly a quarter of a century's experience in working the principle, that the sliding scale is too easy, that modern improvements have assisted in reducing the cost of making gas, and have been ably assisted by the increased demand, so that altogether it is as easy or perhaps easier to earn 12 per cent. at present as it was to get the 10 per cent. in the old days. It is generally admitted that there is a great deal of the "unearned increment" about the sliding scale, and this point appears to have impressed the Committee. And hence their desire to reduce the standard rate to a figure more closely approaching the normal cost of making gas at the present day. And after having fixed upon that, of offering, by means of their secondary sliding scale, an addition both to the rewards for good working, and to the penalties for bad. A weak feature of the sliding scale is that it cannot distinguish between good and bad luck and good or bad management. It rewards or penalizes, as the case may be, for the fluctuations of the market. A company may by skillful management sell 9,500 cubic feet of gas per ton of coal carbonized instead of 9,000, and so be in a position to reduce the price 3d.; or they may achieve the same result by means of a fall in the price of coal. In either case they are equally entitled to increase the dividend. Conversely an important fall in the residuals market may knock one per cent. off the dividend. So long as things about balance each other the scale will give satisfaction. But it is no wonder that, when we hear of 14 or 15 per cent. dividends, we also hear of grumbling consumers. If things told the other way, and dividends went down to 6 or 5 per cent., we should hear of grumbling gas shareholders. The report of the Committee, taken in conjunction with the position of the London Gas Companies, is an interesting dissertation on the advantages—and disadvantages—of the sliding scale.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

The Santa Monica (Cal.) *Outlook* says that the Santa Monica Electric Light and Power Company is convinced that there is money in making and selling gas; which assertion would seem to be correct from the fact that it has empowered the Western Gas Construction Company, of Fort Wayne, Ind., to build for it a complete water gas plant, up to the production of 100,000 cubic feet per day. The contract also provides for a holder, station meter, street main governor, and the necessary connections. The purpose of the Santa Monica Company is to have the new plant in operation by January 1st, 1900. Of course, the length of time implied, between the making of the contract and the laying on of gas, means that the Santa Monica folks will be busily engaged in putting in the main system.

Mr. W. A. Aldrich, writing to the Journal, from Spokane Falls, Wash., under date of the 15th inst., says:

To the Editors American Gas Light Journal: At last, after nine months of weary waiting, a decision has been handed down in the electrolysis case of the Spokane Falls Gas Light Company versus the Washington Water Power Company, or, to write it correctly, the Spokane Street Railway Company. I notified you about two months ago that the judge before whom the case was originally tried rendered a decision in which he said that the action should have been by mandamus and not by injunction; but our lawyers further argued the matter, with the result that he reversed his decision and promised to give his findings upon the merits of the case, which he did to day, with the following result: He said he would grant an injunction to prevent the defendant Company from injuring plaintiff, and ordered defendant to use cast, weld joints in all paved or macadamized streets, and the Chicago bond in all otherwise paved streets. In rendering judgment the judge said the evidence clearly demonstrated that the only method of absolutely preventing stray currents of electricity was the adoption of the double trolley system; that the best single trolley system is based on the cast, welded joint system; that the best bond known is the one classed as the Chicago bond; that it is not practicable to use the cast welded joint, except when the street is paved with such material as asphalt, brick, macadam, blocks, or similar materials; that it was shown by the evidence in this case that the gas pipes of plaintiff had been affected injuriously by electrolysis; and that such injury had been caused by defective bonding of the street railway system. Needless it is to say that the decision is very satisfactory to our Company, and that it is of far reaching importance in that it affects every gas company in the United States located in places where electricity is used as the motor power to run street cars. It is the first official decision given that gas and water companies have some rights in the use of the streets that other companies operating therein and thereon must respect. This trial has been an expensive one for us, and we are not through with the case and its cost as

yet, for the railway company is sure to appeal to the Supreme Court. At any rate, we are glad that our action and its result cannot but be of great service and assistance to other gas companies in the country that are suffering equally with ourselves from that insidious foe—electrolysis. Reference to the paper read by me before the last meeting of the Pacific Coast Gas Association will give you some idea of how serious this matter had become. I congratulate the gas fraternity on the success of the action, in which all may share. * * * I have worked very hard on this case, but feel amply repaid at the results accomplished. I will see to it that the order of the Court is obeyed.

SECRETARY ALDRICH is to be complimented upon the pertinacity shown by him in the conduct of this case; and the compliment should also go out in unstinted measure to the proprietors of the Spokane Falls Gas Light Company who so freely afforded him the financial support neccessary to carry the case to completion.

THE Berlin Iron Bridge Company, of East Berlin, Conn., has been awarded the contract for constructing the new car barns for the New Bedford, Middleboro and Brockton (Mass.) Railway Company. The plans also provide for an engine and boiler room.

A CORRESPONDENT, writing under date of the 18th inst., incloses the following: "A special meeting of the International Acetylene Association was held in the Great Northern Hotel, Chicago, August 14 and 15. Members were present from several States, and some interesting papers were read. Sessions were held from 10 A.M. to noon, and from 2:30 to 5:30 P. M. of Monday, and from 11 to 1, and from 3 to 5 of Tuesday. The banquet, which was held Monday evening, was a joyous time, beginning at 6:30 and ending at 11:30, both P. M., of course. Although the association is made up of active competitors, its objects are solely educational and social, the 'newness' of the industry making the maintenance of such an organization for the comparison of notes and statement ofexperiences almost imperative, if large losses from useless experiments are to be reduced to a minimum. The sessions were principally given up to a running fire of discussion, covering technical and business points that were of great interest to the trade. A committee appointed at the July meeting to take up and consider the situation in Illinois and Wisconsin, with a view to having carbide sold in these two States as freely as it is sold in all the other States, handed in a report which indicated that a remedy for the present illogical position of Illinois and Wisconsin over carbide trading has been found and will speedily be applied. A resolution was adopted calling upon Congress to amend the patent laws upon the lines of the Canadian laws, so that owners of United States patents shall be compelled to sell goods and supply the market at reasonably uniform prices without onerous conditions. A petition to the Electro Gas Company, owners of the base patents on electrical carbide processes, was prepared, which will be presented by members of the Association residing in New York city. In spite of the protracted sessions the greatest harmony prevailed, there being displayed a commendable 'live and let live' policy and spirit, founded on the belief that, under ordinary conditions, there is a fair amount of business for all concerned in the manufacture of good apparatus. All present concurred in the opinion that acetylene presented problems not lightly to be ignored, nor inviting investment or experiment by amateurs because the industry is past the experimental stage, and practically all the patentable means of reducing this excellent lighting medium to practice have been covered. This leaves to late arrivals the threshing of old straw, and, unless all sources of information are carefully scanned and digested, failure is a foregone conclusion. The Association now numbers 42 members. All reputable manufacturers of acetylene generators, burners or sundry supplies are eligible to full membership, on payment of $10 per year; inventors, scientists, salesmen, or others interested in similar lines in the industry are eligible to associate membership, on the payment of $5 per year. One of the principal objects of the Association is to make life a burden to the fakirs who have been so numerous in this new line, and every effort will be made to prevent the admission of such to the Association. The officers of the Association are: President, George Landis Wilson, Chicago; Secretary and Treasurer, J. B. Carroll, Chicago. The President, when interviewed by a reporter as to the purposes of the Association, said: 'The International Acetylene Association is not a combination, trust or agreement, nor is it anything intended to influence prices, or to control, supply or divide territory; but, as representatives of a comparatively new line, the members desire to act together, and, by comparing notes, secure and extend general information in regard to their own business, and maintain an affiliation which shall serve to educate the public along legitimate lines, and offset in some degree the onslaughts of the numerous enemies of this new industry.'"

THE Syracuse Construction Company has placed the order for its new bridge over the Delaware, Lackawanna & Western Railroad, at Syracuse, N.Y., with the Berlin Iron Bridge Company, of East Berlin, Conn.

SUPERINTENDENT RUDY, of the Henderson (Ky.) Company, is completing notable main extensions. The work of rebuilding the benches, which is under the direction of the Parker-Russell Mining and Manufacturing Company, of St. Louis, will be completed in a fortnight or so. The demand for gas in Henderson seems to amaze the gas suppliers there.

SOME time ago we noted that the Stevens Point (Wis.) Lighting Company had been purchased by the Sutherland-Mainland syndicate, and that it was proposed by the new owners to make radical changes on the property. In connection with the earlier mention this note will be of interest. An extension of the franchises owned by the Company permits the present operators to work under them for these periods: On account of gas supply, until 1938; on account of electric light supply, until 1928. The syndicate has also secured the right to furnish the public lighting, either on gas or electric account, until 1908. The works are to be rebuilt, and the reconstruction will be under the direction of the Sutherland Construction and Improvement Company. The executive management of the Stevens Point Company is: President, William Mainland; Secretary and Treasurer, Sinclair Mainland. It is estimated that the cost of the betterments at Stevens Point will not be less than $50,000.

A CONCERN known as the Crockertown Lumber Company, has been organized at Portland, Me., with a capital stock of $200,000, which proposes to engage in trading on a wide and manifold basis. For instance, it will deal in timber, conduct a mining business, and engage in the manufacture of gas and electricity for public and domestic use. Its officers are: President, John Greenleaf, of Berlin, N. H.; Treasurer, Frank W. Marden, of Somerville, Mass. It is also of record that none of the capital stock has been "paid in."

THE New Haven Copper Company has installed in its mills at Seymour, Conn., two 50 horse power gas engines, for use during "periods of low water in the Naugatuck river."

MR. FREDERIC EGNER, writing to us from Norfolk, Va., under date of the 21st inst., says:

To the Editors AMERICAN GAS LIGHT JOURNAL: Reading with interest, pleasure and profit your report of the proceedings of the Seventh Annual Meeting of the Pacific Coast Gas Association, I found a statement, in the paper by Mr. F. H. Eichbaum, entitled "Reminiscences" (JOURNAL, *ante*, p. 287), which, because of the well known and deserved reputation of the author and the interests of your younger readers and students, seems to me to deserve correction. In sending this, however, let me further remark there is no doubt whatever in my mind that the lapse was merely through inadvertence on the part of the author of that most instructive and interesting paper. On page 287 Mr. Eichbaum states: "At that time a 6-foot generator was as large as had been made;" and, from the date further up in the column, "that time" seems to have been the year 1884. The subscriber had designed, constructed and successfully operated a generator of 15 feet 9 inches inside diameter, at the Division street works of the Peoples Gas Light and Coke Company, Chicago, quite some time prior to 1884. Further, said apparatus was in constant daily operation for some years afterwards, and its results have, so far as known to date, not been bettered much, if any.

THE New Jersey Suburban Gas Company, to do business in "the outlying districts" of New Jersey, has been incorporated by Messrs. F. H. Shelton, of Philadelphia; J. D. Shattuck, of Darby, Pa.; Thomas Horton, of Philadelphia, and W. D. Lippincott, of Camden, N. J. It is capitalized in $100,000.

"P. T. R.," under date of the 19th inst., says: "I don't suppose there is much new for your readers in this, but the succeeding Company to the gas, electric and railway properties of Alton, Ills., is the Alton Railway, Gas and Electric Company. It is capitalized in $500,000, and its officers are: Directors, J. F. Porter, H. S. Baker, O. S. Stowell, G. M. Ryrie and C. A. Caldwell; President and Treasurer, J. F. Porter; Secretary, C. A. Caldwell."

MR. C. H. NETTLETON is to be congratulated over the cleverness with which he refunded the debt of the Derby (Conn.) Gas Company.

THE Buffalo (N. Y.) *Times* of recent date is our authority for the statement that the State Inspector of Gas Meters (Jastrow Alexander), and his four deputy inspectors, Joseph Stockmar, of Buffalo, O. F. Price, of Jamestown, Geo. W. Owens, of Brooklyn, and John Pauly,

(*Continued on page* 338.)

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AGENTS:

New York—American News Co., 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, AUG. 28, 1899.

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of Albany, held a meeting in Chautauqua for the purpose of mapping out the State into districts and assigning inspectors for the districts. In the assigning Mr. Owens was placed in charge of the southeastern district, which includes Greater New York. Mr. Owens was at one period of his career a bartender.

THE proprietors of the Peoples Gas Light and Coke Company, of Chicago, have purchased all the properties and interests heretofore enjoyed by the Pullman Palace Car Company in the Pullman (Ills.) gas works.

THE Batavia (Ills.) Gas Company has been incorporated by Messrs. I. C. Copley, F. W. Virchow and E. H. O'Meara. It is capitalized in $30,000.

THERE will be no change, for the far present at least, in the ownership of the Atlantic City (N. J.) gas plant.

MANAGER BISSELL, of the Flushing (N. Y.) Gas and Electric Company, says that its owners are preparing themselves to afford every possible service for the better accommodation of the residents from a lighting point of view. Meanwhile, Mr. Bissell asks the residents to remember that the slowness of the present Company's predecessors may not be recovered in a day.

THE last dividend by the St. Joseph (Mo.) Gas Company (1½ per cent.) is payable the 20th prox.

MR. CHARLES L. SWAN, who had been prominent for many years in the management of the Clinton (Mass.) Gas Light Company, died at his home in that city about a fortnight ago. At the time of his death he was a Director in the Company, and was its Treasurer from 1865 to 1882. Born at Biddeford, Maine, December 13, 1816, he removed to Clinton in 1838, and his life there was that of a man who moved on to fortune while retaining the affection of his family and the respect of his associates.

Death of Prof. Bunsen.

A cable despatch from Heidelberg, Germany, announces the death at Gottingen in his 89th year of Prof. Robert Wilhelm Eberhard Bunsen, M.D., the distinguished chemist. The scientific discoveries of Professor Bunsen were numerous and important, and his reputation was world wide. He invented many widely used scientific devices, among the best known being the Bunsen battery, which, until the introduction of the dynamo, was the cheapest source of electricity; the Bunsen gas burner, by which a non-luminous, smokeless but highly heated flame is obtained, and which is now not only indispensable in all laboratory work, but is also used for heating purposes and for illumination by the incandescent system all over the world; the Bunsen filter pump and the photometer, which are also used in every laboratory. But perhaps his most brilliant discovery was that of spectrum analysis and the spectroscope, made in association with his famous colleague, Professor Kirchhoff, which established a new era in astronomy and led to many valuable discoveries in chemistry. The contributions which Professor Bunsen made in the application of chemistry and physics to the arts and manufactures are of the highest value, and his numerous writings are generally used as text books of the science of chemistry. He was born at Gottingen, Germany, and studied in the University of that town, devoting himself particularly to physical and natural sciences. Subsequently he studied in Paris, Berlin and Vienna.

In 1836 he succeeded Wohler as professor of chemistry at the Polytechnic Institute of Cassel. A few years later he became professor at the University of Marburg and director of the Chemical Institute there. In 1851 he went to the University of Breslau, and in 1852 he passed to the University of Heidelberg as professor of experimental chemistry. There he remained up to the time of his death, having founded at Heidelberg one of the most celebrated schools of chemistry in the world.

The Market for Gas Securities.

The Directors of the Consolidated Gas Company have declared out of the earnings for the past quarter, a dividend of 1 per cent. The conservatism shown by this act is proof that the people who control the Company, having no more stock to sell, are now in business for the benefit of themselves and their small associates. The bears are mindful that the hugging time has come. The course of the shares, so far as the market is concerned, was erratic. Yesterday (Thursday) the difference between the high and low was the difference between 175½ and 178½. To-day the difference was as between 175½ bid and 184½ bid, the latter being the close. Hope deferred maketh the heart sick, but this time, and finally, it looks that some sensible sort of an arrangement, in respect of the artificial lighting supply of New York, is about concluded—in the matter of selling rates, at least.

Brooklyn Union is not within 25 points of its value, provided gas rates are restored all round, at the quotation of 138 bid. Peoples, of Chicago, which Mr. Keene has been unable to harm, is 120 to 121. Bay State is in the dumps at 2 to 2½. The general list is strong.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

AUG. 28.

☞ All communications will receive particular attention

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$39,078,000	100	184½	184¾
Central Union, Bonds, 5's.	3,000,000	1,000	107½	108½
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	115	118
Metropolitan Bonds	658,000	..	108	112
Mutual	8,500,000	100	260	..
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	..	..	
New Amsterdam Gas Co.	13,000,000	100	33	33½
Preferred	10,000,000	100	57	58
Bonds, 5's	11,000,000	1,000	100½	101
Northern Union, Bonds, 5's.	1,250,000	1,000	95	97
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	109	111
" 1st Con. 5's	1,500,000		112	114
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000		
Standard	5,000,000	100	113	115
Preferred	5,000,000	100	134	138
Bonds, 1st Mortgage, 5's	1,500,000	1,000	112	114
Yonkers	299,65	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	138	140
" " Bonds (5's)	15 000,000	1,000	118	119
Bay State	50,000,000	50	2	2¼
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works..	450,000	100	40	.
" 1st Mtg. 5's	450,000	1,000	95	98
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	92	..
2d " " "	3,000,000	1,000	68	71
Buffalo City Gas Co.	5,500,000	100	8	9½
" " Bonds, 5's	5,250,000	1,000	84	85
Central, San Francisco	2,000,000	..	105	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus	1,144,700	100	70	75
1st Mortgage	1,207,000	1,000	106	108
Consumers, Jersey City	2,000,000	100	95	.
" Bonds	600,000	1,000	107½	110
Cincinnati G. & C. Co.	8,500,000	100	191½	192
Consumers, Toronto	1,700,000	50	230	235
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	
Consolidated, Baltimore	11,000,000	100	63	64
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	21	23
" Con. Mtg. 5's	380,000	1,000	87	90
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,560,000	50	99	99½
" Prior Lien 5's	4,546,000	1,000	94¼	94½
Detroit Gas Co., 5's	423,000	1,000	99	99½
" Inc. 5's	31,000	100	.	..
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	.	101
Fort Wayne	2,000,000	..	77	83
" Bonds	2,000,000	..	80	85
Grand Rapids Gas Lt. Co.	1,000,000	50	..	..
" 1st Mtg. 5's	1,125,000	1,000	..	..
Hartford	750,000	25	..	220
Indianapolis	2,000,000	..	122	128
" Bonds, 6's	2 650,000	..	105	106
Jackson Gas Co	250,000	50	50	..
" 1st Mtg. 5's	250,000	1,000	96	100
Jersey City	750,000	20	225	275
Lafayette Gas Co., Ind.	1,000,000	100	68	70
Bonds	1,000,000	1,000	81	86
Louisville	2,570,000	50	106	108
Laclede, St. Louis	7,500,000	100	58	59
Preferred	2,500,000	100	97	97½
Bonds	10,000,000	1,000	107	108
Madison Gas & Elec. Co.	400,000	100	82	85
" 1st Mtg. 6's	350,000	1,000	102	..
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Gas Co	16,000,000	..	50	60
Bonds, 6's	4,600,000	..	107	108
New Haven	1,000,000	25	280	300
Nashville Gas Lt. Co.	1,000,000	50	110	..
Oakland, Cal.	2,000,000	..	53½	55
" Bonds	750,000	..	..	..

Peoples G. L. & Coke Co., of Chicago	25,000,000	100	120½	121
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	111½	112
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	215	..
Rochester Gas & Elec. Co.	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	70	73
St. Paul Gas Light Co	1,500,000	100	50	52
1st Mortgage 6's	650,000	1,000	82	85
Extension, 6's	600,000	1,000	..	..
General Mortgage, 5's	2,428,000	1,000	80	82
St. Joseph Gas Co	1,000,000	100	42	44
" 1st Mtg. 5's	750,000	1,000	96	99
Syracuse, N. Y.	1,750,000	100	..	13
Bonds	1,612 000	1,000	81	84
Washington, D. C	2,600,000	20	280	..
First mortgage 6's	600,000	..	.	..
Western, Milwaukee	4,000,000	100	99	100
Bonds, 5's	3,830,500	.	106	108
Wilmington, Del.	600,000		214	..

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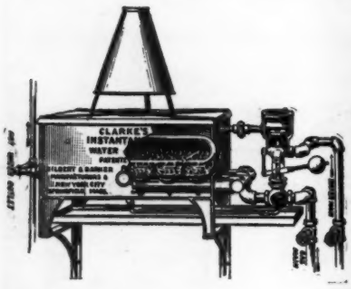

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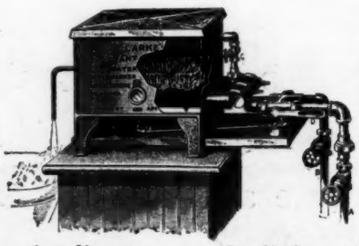

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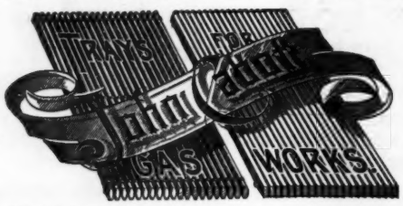

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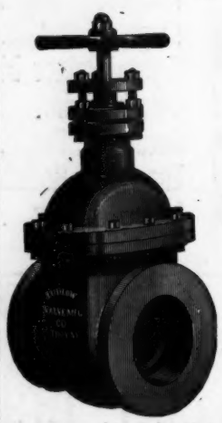

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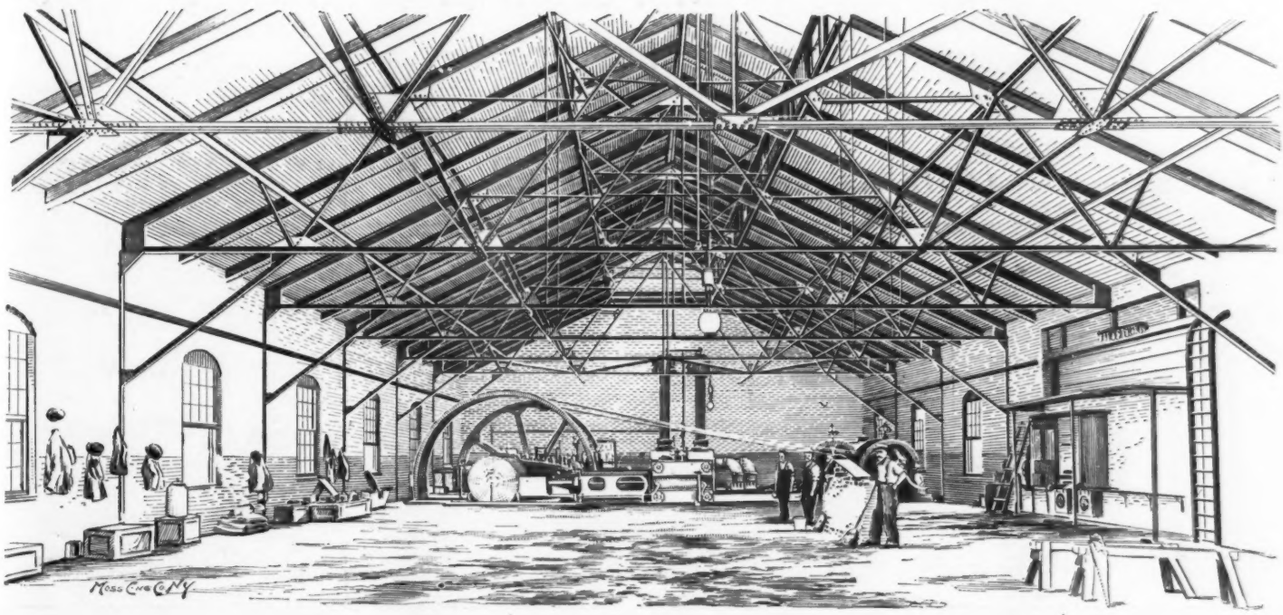
THE BERLIN IRON BRIDGE CO.

Engineers, Architects and Builders of Steel Structures.



The above illustration is taken direct from a photograph and shows the interior of an Engine Room or Power House, which was designed and built by us for the Scranton Traction Company, at Scranton, Pa. The building is 60 feet wide and 120 feet long, the framework being entirely of steel. Between the steel sideposts is placed a light brick wall to protect the interior from the weather, and ventilation is secured by a monitor the full length of the building, with swinging sash on the sides. The roof is covered with slate secured to the roof plank.

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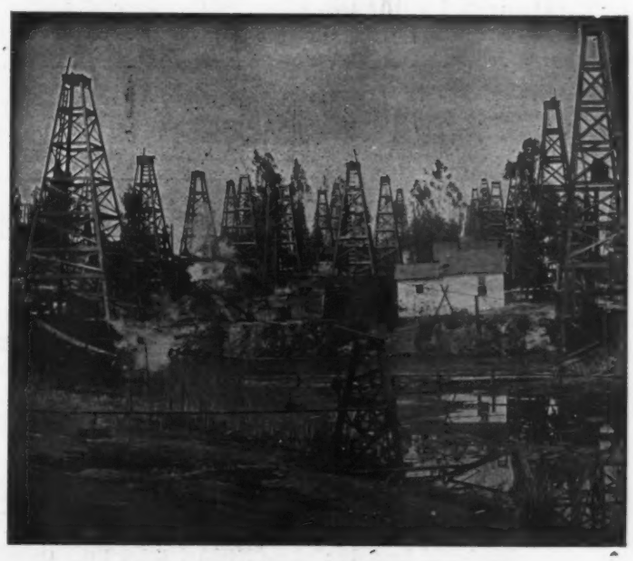
Nowhere else on this continent does such opportunity exist for profitable gas investment as on the Pacific Coast, since the perfection of the new LOWE Process for using the heavy crude California oils (of which there is an unlimited supply) without the use of any other fuels. Seven years' test proves the system to be perfect in every respect. Los Angeles alone, in addition to present street mains, has 150 miles of well built up streets without a gas main on them. To occupy this territory, and a large number of other towns now without gas, we have organized a parent company and a number of local companies covering some of the fastest growing cities in the United States.

Now is the time to invest, when the first capital will be able to double itself in a single year. This is also the most delightful residence section in the United States.

We suggest to those desiring gas investments, in large or moderate amounts—with or without active business connections—to come here and investigate; or, what is the next best thing, write us for particulars and prospectus.

The accompanying cut shows the oil wells in the suburbs of Los Angeles from which the Companies under the NEW LOWE GAS PROCESS obtain their supply of oil.



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AMERICAN GAS COMPANY

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Recuperative Furnaces, Washers, Condensers, Purifiers and Purifying Machines, Ammonia Plant, Coke Conveyers, Etc.

Complete Works Erected with Guaranteed Results.

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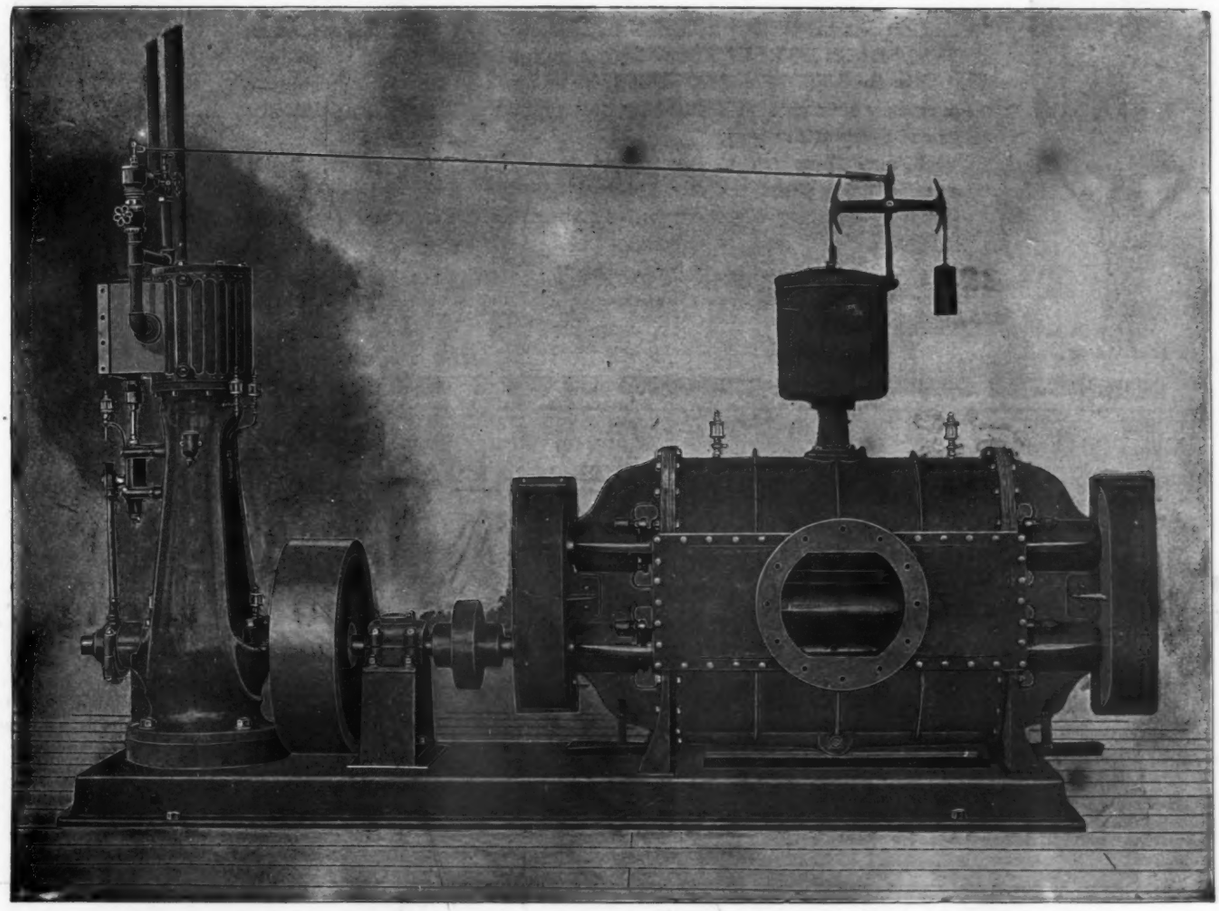
GUARANTEED TO REGULATE WITHIN ONE-TENTH OF AN INCH, WATER PRESSURE.

The Most Perfect Gas Governor on the Market.

MORE DIRECT IN ACTION. FEWER PARTS.
EASIER TO ADJUST THAN ANY OTHER GOVERNOR.



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By the UNIFORM DISTRIBUTION of light on scientific principles a greater area can be lighted by our system and more economically than in any other way.

Where there are no gas mains already laid, we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, enabling Gas Companies to furnish a uniform light in all localities.

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This Edition of the "Handbook for Gas Engineers and Managers" is a great improvement on all previous editions Much of the text has been re-written, in order to keep the work abreast of the constant advances that are being made in the Gas Industry.

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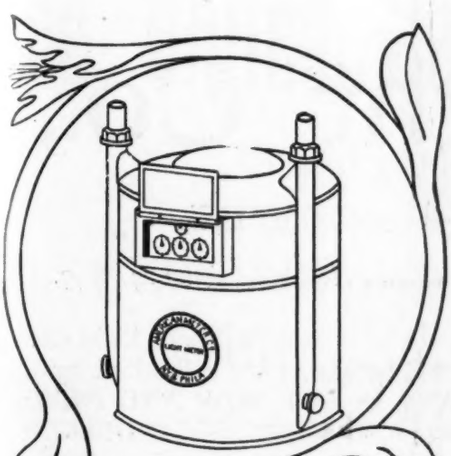

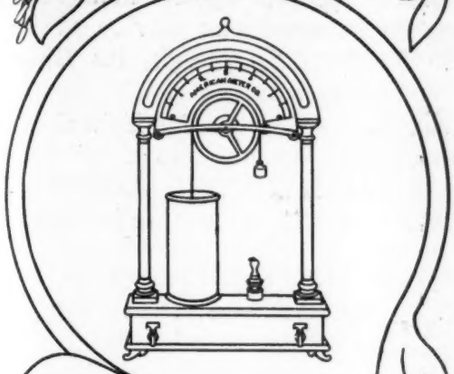

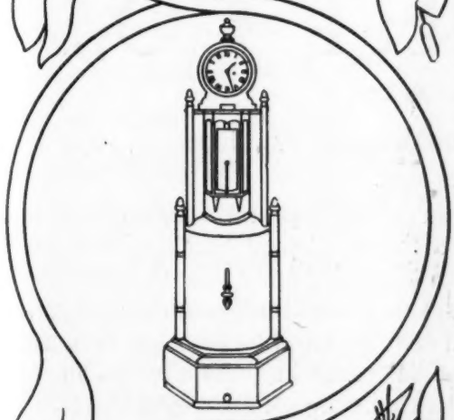

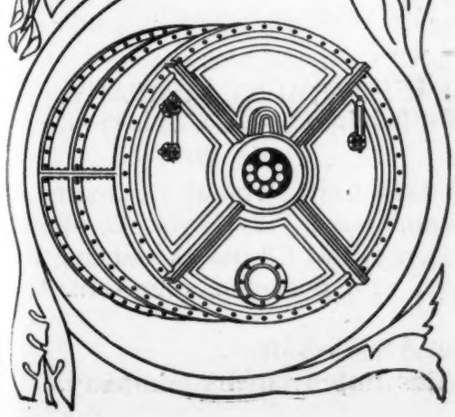

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CHICAGO, ST. LOUIS,

SAN FRANCISCO.

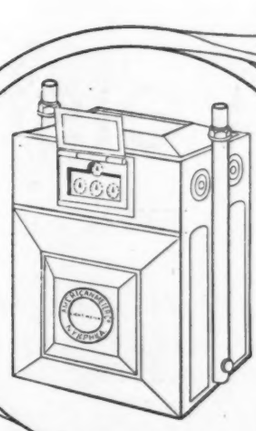
PUBLIC LIGHTING TABLE.

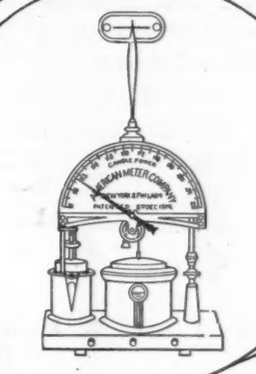
SEPTEMBER, 1899.

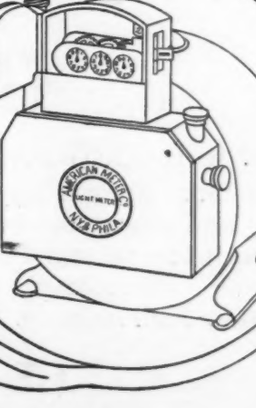
Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Fri.	1	7.10 PM	4.30 AM	6.30	4.20
Sat.	2	7.10	4.30	6.30	4.20
Sun.	3	7.00	4.30	6.15	4.30
Mon.	4	7.00 NM	4.30	6.15	4.30
Tue.	5	7.00	4.30	6.15	4.30
Wed.	6	7.00	4.30	6.15	4.30
Thu.	7	7.00	4.30	6.15	4.30
Fri.	8	7.00	4.30	6.15	4.30
Sat.	9	7.10	4.30	6.15	4 30
Sun.	10	7.50	4.40	6.05	4.40
Mon.	11	8.40	4.40	6.05	4.40
Tue.	12	9.40 FQ	4 40	6.05	4.40
Wed.	13	10.40	4 40	6.05	4.40
Thu.	14	11.50	4.40	6.05	4.40
Fri.	15	1.00 AM	4.40	6.05	4.40
Sat.	16	2.20	4.40	6.05	4.40
Sun.	17	3.40	4.40	5.55	4.50
Mon.	18	No L.	No L.	5.55	4.50
Tue.	19	No L. FM	No L.	5.55	4 50
Wed.	20	No L.	No L.	5 55	4.50
Thu.	21	6.30 PM	8.00 PM	5.55	4.50
Fri.	22	6.30	8.40	5.55	4.50
Sat.	23	6.30	9.20	5.55	4.50
Sun.	24	6.20	10.10	5.40	5.00
Mon.	25	6.20	11.00	5.40	5.00
Tue.	26	6.20 LQ	12.00 AM	5.40	5.00
Wed.	27	6.20	1.00	5.40	5.00
Thu.	28	6.20	2.00	5.40	5.00
Fri.	29	6.20	3.00	5.40	5.00
Sat.	30	6.20	3.50	5.40	5.00

TOTAL HOURS LIGHTING DURING 1899.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	215.40	January	423.20
February	184.40	February	355.25
March	187.40	March	355.35
April	166.50	April	298.50
May	158.00	May	264.50
June	140.50	June	234.25
July	150.30	July	243.45
August	168.30	August	280.25
September	179.50	September	321.15
October	213.20	October	374.30
November	217.00	November	401.40
December	238.10	December	433.45
Total, yr.	2221.00	Total, yr.	3987.45







OFFICE OF THE

Welsbach Light Co.,

BROAD AND ARCH STREETS,

PHILADELPHIA, PA., June 23, 1899.

To the Stockholders of the Welsbach Light Company:

In answer to the many inquiries received from the stockholders as to whether the Welsbach Light Company is interested in the Kern Light or the Kern Incandescent Gas Light Company, I am authorized by the Board of Directors of this Company to advise you that **THIS COMPANY IS NOT NOW AND NEVER HAS BEEN INTERESTED IN EITHER THE KERN LIGHT OR THE KERN INCANDESCENT GAS LIGHT COMPANY. The Kern Light, or, to designate it more properly, the Kern Bunsen Burner for use with an incandescent mantle, and the United States patents upon which it is based, were offered to this Company, which refused to purchase them upon the advice of its experts, Dr. Charles F. Chandler, of Columbia College, and Dr. Waldron Shapleigh, its Chief Chemist, and of its Patent Council, Mr. John R. Bennett, of New York City.**

This Company is not now and never has been interested in the Welsbach Incandescent Gas Light Company of England, nor is that Company interested in this Company. Your attention is called to the following correspondence, which defines **THE POSITION OF THE UNITED GAS IMPROVEMENT COMPANY**, whose name is mentioned in the advertisements which offer for subscription the stock of the Kern Incandescent Gas Light Company.

WELSBACH LIGHT COMPANY,
W. E. BARROWS, President.

WELSBACH LIGHT CO.,

BROAD AND ARCH STREETS,

PHILADELPHIA, PA., June 23d, 1899.

MR. THOMAS DOLAN, President the United Gas Improvement Company:

DEAR SIR: In yesterday's and to-day's New York and Philadelphia papers appear the advertisements of the International Banking and Trust Company soliciting subscriptions to the Capital Stock of the Kern Incandescent Gas Light Company. Among the names of the Directors of the said Trust Company published in the advertisements referred to appears the name of "George W. Elkins, United Gas Improvement Company, Philadelphia." As the United Gas Improvement Company has been prominently identified with the Welsbach Light ever since its introduction into the United States, the publication of its name in these advertisements, which also contain suggestions hostile to this Company, has greatly disquieted many of our shareholders. If you are willing to give me an authoritative statement of the position of the United Gas Improvement Company I shall be greatly obliged. Very truly yours,

W. E. BARROWS, President Welsbach Light Company.

THE UNITED GAS IMPROVEMENT COMPANY,
Broad and Arch Sts., Philadelphia, June 23d, 1899.

COL. W. E. BARROWS, President Welsbach Light Company:

Dear Sir: Answering your favor of even date, the United Gas Improvement Company is not now and never has been interested either in the Kern Incandescent Gas Light Company or in the International Banking and Trust Company. Mr. George W. Elkins is neither an Officer nor a Director of the United Gas Improvement Company, and does not represent the United Gas Improvement Company. Very truly yours,

THOMAS DOLAN, President,
United Gas Improvement Company.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

THE STANDARD JUNIOR,

THE STANDARD DOUBLE SUPERHEATER,

LOWE WATER GAS APPARATUS.

Under Contract, 1899:

	SETS.	DAILY CAPACITY.
Fostoria, O.	1	250,000 Cubic Feet.
Derby, Conn.	1	750,000 "
Lowell, Mass.	1	1,000,000 "
Doylestown, Pa.	1	50,000 "
Darby, Pa.	1	400,000 "
Adrian, Mich.	1	125,000 "
Concord, N. H.	1	400,000 "
Sioux City, Iowa	1	750,000 "
Standard Gas Light Co., New York	3	5,400,000 "
Peekskill, N. Y.	1	250,000 "
Westchester, N. Y.	1	250,000 "
Jersey City, N. J.	1	1,000,000 "
Stapleton, N. Y.	1	750,000 "
London, O.	1	125,000 "
Chicago, Ills.	2	3,600,000 "
Putnam, Conn.	1	125,000 "
Mansfield, O.	1	250,000 "
Plymouth, Pa.	1	125,000 "
Athens, Pa.	1	125,000 "
Charlotte, N. C.	1	250,000 "
Total	23	15,975,000 "
Previously built	294	187,100,000 "
Grand Total	317	203,075,000 "

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FIRE BRICK . . . .
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This is the *original* coal-consuming Furnace for Retort Benches. Burns either Coal or Coke. Full and Half-Depth Regenerative Furnaces for Benches of 6's, 7's, 8's or 9's erected complete.

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Price List, f.o.b. Galesburg or Mount Vernon.

In Casks, 400 to 800 pounds, at 5 cents per pound.
In Kegs, 100 to 200 " " 6 " "
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Containing 6, 8 or 9 Retorts.

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Gas Plant Machinery

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A SPECIALTY.

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AUTOMATIC GOVERNOR.
OVER FOUR HUNDRED NOW IN USE! NO WORKS COMPLETE WITHOUT IT!
WILL PAY FOR ITSELF WITHIN A YEAR! ITS SERVICE SECURES PERFECT DISTRIBUTION!
REDUCES LEAKAGE TO MINIMUM, and BENEFITS THE COMPANY and CONSUMER ALIKE!
IT IS THE ONLY RECOGNIZED AUTOMATIC GOVERNOR IN THE WORLD!

STEAM JET EXHAUSTER. Designed particularly for small works. Combines Exhaust Tube, Steam Governor, Gas Compensator and Bye-Pass Valves in the most compact form possible. Occupies but little space; uses very little steam; saves formation of carbon in retorts; increases yield 10 to 15 per cent. No works too small to use them profitably.

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Hughes' "Gas Works,"

Their Construction and Arrangement,

And the Manufacture and Distribution of Coal Gas.

Originally written by SAM'L HUGHES, C.E.

Rewritten and Much Enlarged by
WM. RICHARDS, C.E

Eighth Edition, Revised, with Notices of Recent Improvements.

Price, $1.65.

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By JOHN HORNBY, F.I.C.

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The Chemistry of Illuminating Gas.

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Parson's Steam Blower,

FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREZEE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER,

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JAMES D. PERKINS, President. F. SEAVERNS, Treasurer.

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Offices:
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STRICTLY High Grade. . . . .
Carefully prepared.
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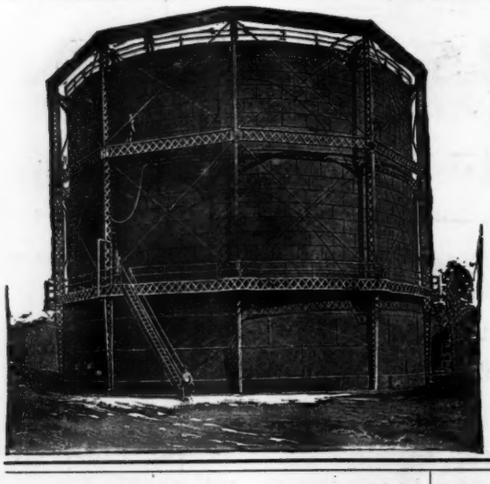

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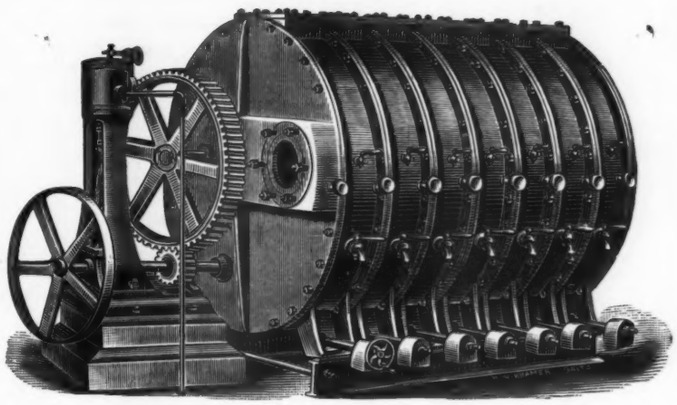

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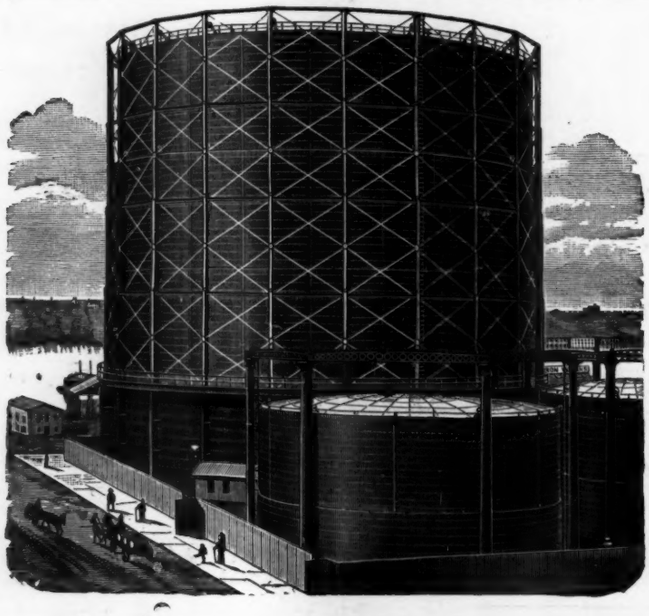

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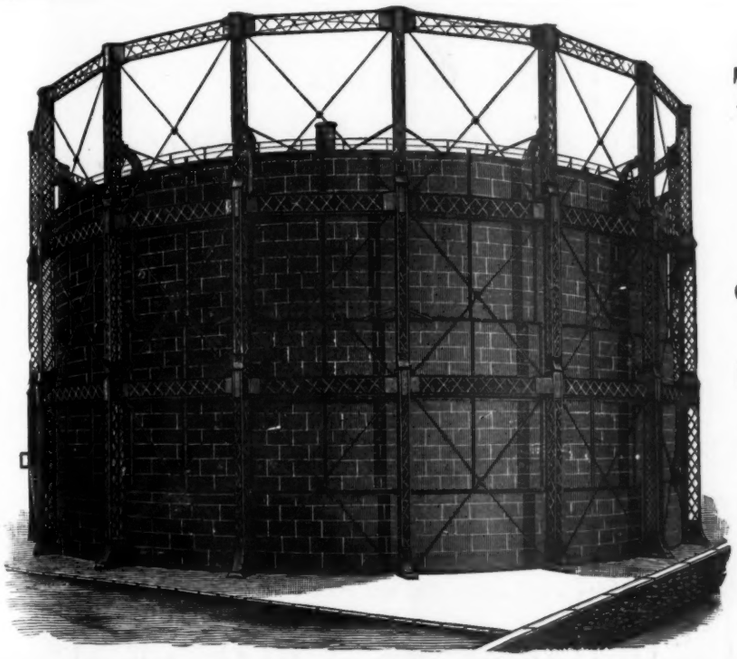

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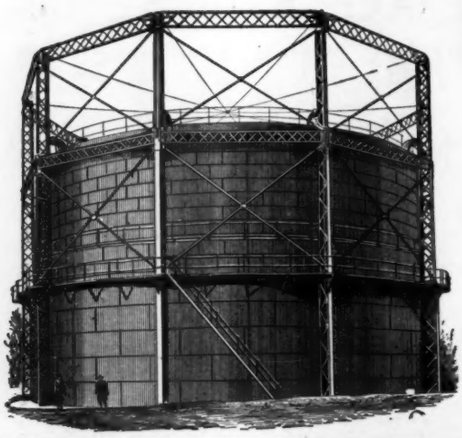

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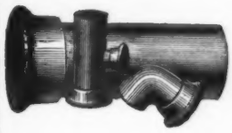

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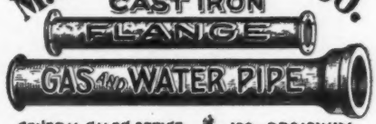

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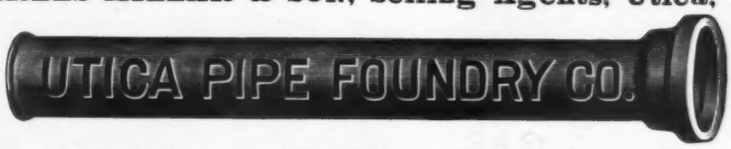

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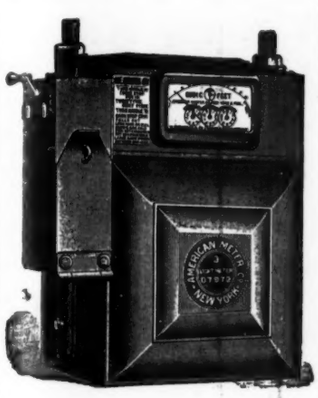

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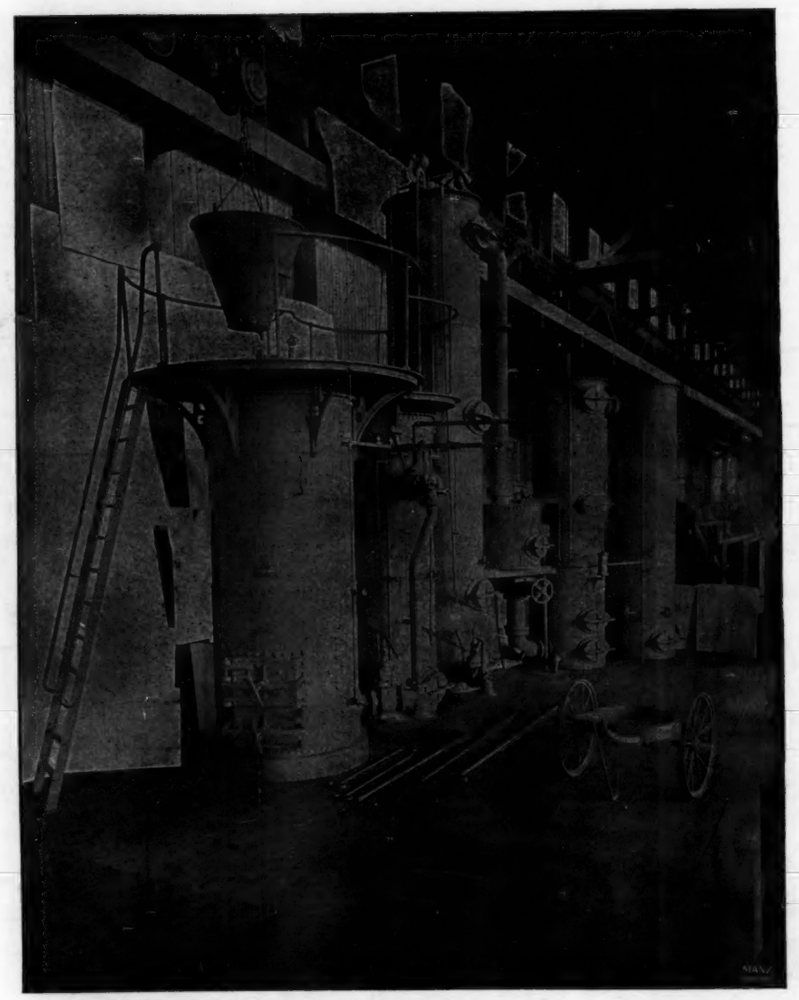
WHEN A GAS MAN KNOWS

THAT HIS



This is not special—it happens to all, only the others haven't the honor of appearing in the JOURNAL.

If you elsewhere see this style of AUTOMATIC FUEL CHARGING DEVICE;
If you elsewhere see this style of DOUBLE SUPER-HEATER PLATFORM APPARATUS;
REMEMBER, it has been COPIED BODILY FROM US.

IMPROVED LOWE WATER GAS APPARATUS

Is **completely put together** in our shop before shipment, being only dismantled sufficiently for transportation, **he has an assurance,** not otherwise possible, that when it is re-erected in his works **it will fit, and Look to Fit, and, most important, IS FIT.**

WILLIAM HENRY WHITE,
EASTERN ENGINEER,
32 Pine St., New York.

The Western Gas Construction Co.,
FORT WAYNE, INDIANA.